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WA #: 032-RICO-02KD

# Region 2 RAC2 Remedial Action Contract

## **Final** **Remedial Investigation Addendum**

**Matteo & Sons, Inc. Site, OU1**

**Remedial Investigation/Feasibility  
Study**

**Thorofare, New Jersey**

May 22, 2019

**CDM  
Smith**

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## Acronyms

µg/kg	microgram per kilogram
µg/L	microgram per liter
bgs	below ground surface
CDM Smith	CDM Federal Programs Corporation
CLP	Contract Laboratory Program
DESA	Division of Environmental Science and Assessment
EPA	United States Environmental Protection Agency
FS	feasibility study
Matteo	Matteo & Sons, Inc.
MCC	maximum contaminant concentration
mg/kg	milligram per kilogram
mg/L	milligram per liter
NJNRDCSRS	New Jersey Non-Residential Direct Contact Soil Remediation Standard
NJRDCSRS	New Jersey Residential Direct Contact Soil Remediation Standard
OSC	on-scene coordinator
OU	operable unit
PCB	polychlorinated biphenyl
RCRA	Resource Conservation and Recovery Act
RI	remedial investigation
SVOC	semivolatile organic compound
TAL	Target Analyte List
TCL	Target Compound List
TCLP	toxicity characteristic leaching procedure
VOC	volatile organic compound
Weston	Weston Solutions, Inc.
XRF	x-ray fluorescence

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# Section 1

## Introduction

CDM Federal Programs Corporation (CDM Smith) received Work Assignment 032-RICO-02KD under the Remedial Action Contract 2 to perform a remedial investigation (RI)/feasibility study (FS) for the U.S. Environmental Protection Agency (EPA), Region 2 at the Matteo & Sons, Inc. (Matteo) site, Operable Unit (OU) 1, located in Thorofare, West Deptford Township, Gloucester County, New Jersey. A final RI report was submitted in January 2018, and a revised draft FS was completed in August 2018. Since the completion of the final RI, EPA performed additional investigations. These additional investigations were conducted at the 2.3-acre rental home property owned by the Matteo family, adjacent to the Matteo scrapyard facility, and at a 4-acre property located on the opposite side of Crown Point Road known as Mira Trucking as shown in Figure 1-1 and adjacent residential properties.

Investigation at the rental home property consisted of potable well water sampling in November 2018 performed by CDM Smith on behalf of EPA. Investigation at the Mira Trucking property included several phases of investigation (Phases 1A, 1B, and 2) completed in November 2017, April 2018, and December 2018 by Weston Solutions, Inc. (Weston) on behalf of EPA to investigate potential battery casing waste and lead contamination on the Mira Trucking property and adjacent residential properties. The Mira Trucking investigation included sampling at five residential properties adjacent to the Mira Trucking property completed during Phase 1B in April 2018.

The objective of this RI addendum report is to summarize the results of these investigations and present the nature and extent of contamination at the Mira Trucking property and adjacent properties to evaluate appropriate remedial alternatives to address contamination at the property under the Matteo OU1 site.

### 1.1 Site Description

The Matteo OU1 site is located at 1708 U.S. Highway 130 (1692 Crown Point Road) in Thorofare, West Deptford Township, Gloucester County, New Jersey. The site has been divided into several areas based on physical features, historical information, and the locations of samples collected during the RI and previous investigations. One of these areas includes the rental home property, a 2.3-acre area owned by the Matteo family and separated from the Matteo scrapyard facility by a chain link fence (Figure 1-1). The property is located in the eastern corner of the Matteo OU1 site and has several tenants, including children.

Mira Trucking is a 178,000-square-foot property at 1689 Crown Point Road. It is on the opposite side of Crown Point Road, 400 feet southeast of the Matteo scrapyard facility (Figure 1-1) in West Deptford Township, Gloucester County, New Jersey. The northeastern portion of the property consists of a vacant residence and a retention basin; the western and southern portions of the property are defined by a truck staging area and a truck repair garage.

The retention basin is a 14,000-square-foot low lying vegetated area where stormwater pools. It is vegetated with grass and several shrubs, and has a storm drain that leads to a storm sewer. The discharge point for the storm sewer is unknown; however, it is likely that it discharges into one of the adjacent two water bodies, Hessian Run or Woodbury Creek. The retention basin was dry during the site visits performed by Weston, indicating that there is rarely (if ever) standing water in the basin.

The northern portion of the truck staging area is a 32,000-square-foot gravel lot (Truck Staging Area 1), and the southern portion is a 25,000-square-foot field (Truck Staging Area 2), as shown in Figure 1-2. This southern portion was previously heavily forested; however, the property owners cleared the vegetation in August 2018 likely to make additional space for staging trucks. The 60,000-square-foot area currently has minimal vegetation and is covered with wood chips, soil, and gravel. The property is bisected by a 4-foot-high berm that runs approximately 300 feet in length from the northeast corner of the site near the retention basin to the southwestern corner in the truck staging area. The Mira Trucking property is bounded by Crown Point Road to the northwest; a landscaping supply company to the northeast; residential properties to the east and southeast; and a trucking company, storage facility, and residential property to the west. The residential properties to the south and west were the subject of the Phase 1B investigation conducted by Weston.

For tracking and privacy purposes during the investigation, Weston referred to the Mira Trucking property as P001, and the five residential properties investigated were referred to as P002 through P006 (Figure 1-2). The residential property located along the western property boundary of the Mira Trucking property was identified as P002. The four residences on Meadowcroft Road along the southeastern property boundary of the Mira Trucking property were identified from north to south as P003 through P006.

## 1.2 Site History

According to available records, the Matteo family, under various names (James Matteo and Sons, Inc.; Matteo Trucking Company; Thorofare Trucking and Trash Company; and Matteo Iron and Metal), has operated an unregistered landfill and a metals recycling facility at the Matteo OU1 site since 1961. Matteo site operations included scrap metal recycling, landfilling of crushed battery casings and household waste, and storage of drums containing hazardous waste. These activities resulted in contamination of soil, sediment, and groundwater, which was confirmed on the Matteo OU1 site during the 2012/2015 RI (CDM Smith 2018) which, at the time, included the Matteo scrapyard facility, disposal area, and the rental home property. Lead, antimony, copper, zinc, and polychlorinated biphenyls (PCBs) were identified as site-related contaminants based on current and historical site information and the elevated concentrations and spatial distribution of the contaminants. Surface soils on the rental home property were also sampled during the initial RI investigation and found to contain concentrations of metals, including lead, at concentrations above the RI screening criteria. The potable well on the rental home property was sampled in 2012 under the OU1 RI. The results for the potable well sampling event are discussed in Section 3.1.

During the 2016 OU2 investigation of the 36 single-family residential properties located in and adjacent to the Tempo Development on Woodlane Drive, Birchly Court, Oakmont Court, Hessian

Avenue, and Crown Point Road, a resident informed EPA that dumping may have occurred at the Mira Trucking property as part of Matteo operations. In November 2017, the first round of sampling was conducted at the Mira Trucking property.

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## Section 2

### Study Area Investigation

The following sections summarize the investigations that have taken place since the submission of the final RI report in January 2018.

#### 2.1 Rental Home Property Potable Well Sampling

On November 28, 2018, CDM Smith sampled the Matteo Rental Home Well (PW-1). According to the property owner, the potable water system includes a 300-foot-deep, 4-inch-diameter stainless steel supply well and a 32-gallon pressure storage tank. The depth to water in the well is 50 feet below ground surface (bgs). The total system volume was estimated to be 195 gallons. The well was sampled at two locations: one location in the basement of the rental home before the water entered the home's water softening system (influent) and a second location at the kitchen sink (effluent). These samples were identified as PW-1-INF and PW-1-EFF, respectively. Prior to sampling, the kitchen and bathroom taps were opened for a combined 5.3 gallons per minute flow to purge the system. Approximately 371 gallons were purged prior to collection of PW-1-INF, and approximately 530 gallons were purged prior to collection of PW-1-EFF.

The samples collected were analyzed for Target Compound List (TCL) volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, and PCBs; Target Analyte List (TAL) metals; cyanide; and hexavalent chromium. Samples for TCL pesticides, PCBs, and SVOCs were analyzed by Shealy Environmental Services via the EPA Contract Laboratory Program (CLP). Samples for TCL VOCs, TAL metals, cyanide, and hexavalent chromium were analyzed by the EPA Division of Environmental Science and Assessment (DESA).

#### 2.2 Mira Trucking Property Soil and Waste Investigations

The following sections summarize the investigation activities conducted at the Mira Trucking property in November 2017, April 2018, and December 2018.

##### 2.2.1 Phase 1A – November 2017 Removal Assessment and Remedial Investigation

In November 2017, Weston initiated Phase 1A of the removal assessment and RI at Mira Trucking property (Weston 2018a). The *Final Removal Assessment Sampling Report, Revision 2* for this work is included as Appendix A. A summary of all samples collected during the investigation is provided in Table 1 in Appendix A. Phase 1A sample locations are shown in Figure 3 in Appendix A. The work completed included a geophysical survey, test pit investigation, solid waste sampling, surface and subsurface soil sampling, and battery casing reconnaissance and sampling.

##### 2.2.1.1 Geophysical Survey and Test Pit Investigation

A geophysical survey was performed to identify subsurface geophysical anomalies at the Mira Trucking property. The results of the survey were used to define nine areas of concern as shown in Figure 3 in Appendix A. A total of 64 test pits were excavated to a maximum depth of 6 feet bgs, targeting the 9 areas of concern and additional locations as directed by the EPA On-Scene



Coordinator (OSC). Soil characteristics, changes in lithology, and the presence of solid waste and/or battery casing material were documented at each test pit. Soil samples were collected from test pit sidewalls based on visual observations of soil characteristics. The soil was then placed in a designated polyethylene bag where the sample was homogenized and screened on-site for lead using x-ray fluorescence (XRF) technology. Each soil sample was screened three times for lead using a screening interval of approximately 30 seconds. The three screening results were then averaged to determine the total concentration of lead. Approximately 31 percent of the soil samples were sent to the Chemtech Consulting Group (Chemtech) laboratory for confirmatory analyses of TAL metals, mercury, and cyanide. Chemtech is an accredited laboratory under the National Environmental Laboratory Program (NELAP).

#### **2.2.1.2 Solid Waste Sampling**

Three different types of solid waste materials were observed in test pit P001-TPI1, located in the southwestern portion of Truck Staging Area 2 (Figure 3 in Appendix A). The solid waste materials appeared to be three different types of off-specification plastic, which consisted of small beads, rope-like extrusions, and a massive, solid barrel-like piece. A sample was collected of each of the solid waste materials for laboratory analyses. The solid waste samples were placed in polyethylene bags and homogenized using a hammer. Additional soil samples were collected from the area surrounding the solid waste. The solid waste samples and soil samples were sent to Chemtech, and analyzed for TCL VOCs, SVOCs, PCBs, and pesticides; TAL metals; mercury; cyanide; Resource Conservation and Recovery Act (RCRA) characteristics (corrosivity, reactivity, and ignitability); and toxicity characteristic leaching procedure (TCLP) VOCs, SVOCs, pesticides, herbicides, and metals.

#### **2.2.1.3 Surface Soil Sampling**

A total of 63 surface soil samples were collected from the first 2 inches of soil at each designated sample location (Figure 3 in Appendix A). Soil was extracted using plastic scoops and placed in a designated polyethylene bag where the soil was homogenized. Battery casing material identified in the soil samples was segregated for composite sampling. All bagged soil samples were screened on-site for lead using XRF technology. Each soil sample was screened three times for lead using a screening interval of approximately 30 seconds. The three screening results were then averaged to determine the total concentration of lead. Approximately 31 percent of the soil samples were sent to Chemtech for confirmatory laboratory analyses of TAL metals, mercury, and cyanide. Soil characteristics and the presence of battery casing material were documented at each sample location.

#### **2.2.1.4 Battery Casing Reconnaissance and Sampling**

Battery casing material was observed in 31 surface soil samples and 35 test pit locations. The material was segregated into nine different groups based on geographical location as shown in Figure 4 in Appendix A. The material in eight of the nine groups was then composited in a polyethylene bag. The battery casing material in test pit P001-TPF8 was treated as a discrete sample because of the large volume of material present. Composite and discrete samples of battery casing material were sent to Chemtech and analyzed for TCLP metals and total lead.

### 2.2.2 Phase 1B – April 2018 Residential Property Sampling

In April 2018, Weston initiated Phase 1B of the investigation with a soil sampling event at five residential properties adjacent to the Mira Trucking property (Weston 2018b). The *Final Removal Assessment Sampling Report* for this work is included as Appendix B. A summary of all samples collected is provided in Table 1 in Appendix B. Sample locations are shown in Figure 2 in Appendix B. The investigation performed included surface and subsurface soil sampling at each property and a physical reconnaissance to identify and document the presence of battery casing material on the ground surface.

#### 2.2.2.1 Surface/Subsurface Soil Sampling

Six locations were sampled at each of the five residential properties, for a total of 30 residential sample locations. At property P002, sample locations were along the eastern property boundary, in the backyard, and to the west of the residence near the driveway. At properties P003, P005, and P006, sample locations were distributed in three two-point transects, each consisting of two sample locations spaced at intervals of approximately 30 feet. At P004, sample locations were distributed in two three-point transects. Soil borings were advanced with non-dedicated stainless-steel hand augers, and discrete soil samples were collected from 0 to 2, 2 to 6, and 6 to 12 inches bgs. Decontamination of the non-dedicated sampling equipment was performed between sampling intervals and locations and consisted of an Alconox® solution scrub and potable water rinse. No battery casing material was observed in the soil samples collected from the residential properties. All samples on the residential properties were analyzed by the DESA laboratory for total lead.

#### 2.2.2.2 Battery Casing Reconnaissance

During reconnaissance at the five properties, a small piece of suspected battery casing material was observed on property P002 in the garden area located at the front of the residence. No battery casing material was observed on properties P003 through P006.

### 2.2.3 Phase 2 – December 2018 Removal Assessment and Remedial Investigation

In late August 2018, the owner of the Mira Trucking property and adjacent property cleared and grubbed more than 100 trees, leaving trees and stumps piled up and strewn across the property and exposing battery casing waste that was not previously identified. Weston performed an additional investigation in December 2018 to delineate the areas that were not previously investigated (Weston 2019). The *Removal Assessment Sampling Report* for this work is included as Appendix C. A summary of all samples collected is provided in Table 1 in Appendix C. Sample locations are shown in Figures 4 and 5 in Appendix C. The completed work included surface and subsurface soil sampling and physical reconnaissance to identify, document, and sample battery casing material on the ground surface.

#### 2.2.3.1 Surface/Subsurface Soil Sampling

During the investigation, soil samples were collected from 160 sample locations organized in a grid on the Mira Trucking property. Sample locations within the grid were biased to the location where the highest density of battery casing material was observed. An additional four sample locations were added in areas of the Mira Trucking property that were not previously delineated

in the Phase 1 investigation. Six sample locations were also added in the P002 residential property to delineate the lead contamination discovered during the Phase 1b sampling event.

Soil samples were collected from depths of 0 to 2, 2 to 6, 6 to 12, 12 to 18, and 18 to 24 inches bgs at all 164 sample locations on the Mira Trucking property. In two locations, P001-SS142 and P001-SS148, a high density of battery casing material was observed deeper than 24 inches. Therefore, additional soil samples were collected from the 24- to 30- and 30- to 36-inch bgs depth intervals at these two locations. On P002 residential property, samples were collected from the following depth intervals: 0 to 2, 2 to 6, and 6 to 12 inches bgs. All the soil samples were collected with dedicated plastic scoops and non-dedicated stainless-steel hand augers and shovels. Decontamination of the non-dedicated sampling equipment was performed between sampling intervals and locations and consisted of an Alconox® solution scrub and potable water rinse.

During soil sampling, observations of battery casing material were documented. The following terms were used to describe the density of battery casing material present at each of the sample locations: none (0 battery casing fragments present), minor (1 to 3 battery casing fragments present), moderate (4 to 12 battery casing fragments present), and significant (greater than 12 battery casing fragments present).

A total of 842 soil samples were collected and screened on-site for lead using XRF technology. Prior to screening, any battery casing material present in the soil samples was removed. In the seven soil sample intervals that had significant battery casing material present, the material was segregated for discrete sampling as part of the battery casing sampling discussed below. Each soil sample was screened three times for lead using a screening interval of approximately 60 seconds. The three screening results were then averaged to determine the total concentration of lead.

A total of 25 percent of the XRF soil samples (212 soil samples) were selected by the EPA OSC for confirmatory laboratory analysis. These soil samples and 13 additional quality assurance/quality control samples were submitted to Chemtech to be analyzed for TAL metals and mercury. Of the total samples, the EPA OSC selected 26 samples with the highest concentration of battery casing material and/or XRF lead concentrations to be analyzed for TCL PCBs.

#### **2.2.3.2 Battery Casing Reconnaissance and Sampling**

The battery casing reconnaissance was conducted using the same grid as the soil sampling, separating the property into 160 areas of 25 square feet each. At each 25-square-foot area, the following terms were used to describe the amount of battery casing material present: none (0 battery casing fragments present), minor (less than 10 battery casing fragments present), moderate (between 10 and 100 battery casing fragments present), and significant (greater than 100 battery casing fragments present). The results of this survey are presented in Figure 3 of Appendix C. At the discretion of the EPA OSC, nine composite battery casing samples, including one field duplicate, were collected from several grids based on geographical location. In addition, as mentioned in the surface/subsurface soil sampling description above, seven discrete battery casing samples were collected from subsurface soil sampling intervals where significant concentrations of battery casings were observed. The battery casing samples were submitted Chemtech for analysis for TCLP metals, PCBs, total lead, and antimony.

## Section 3

### Data Evaluation

The following sections summarize the results and findings of the November 2018 sampling of the potable well on the rental home property and EPA's investigations at the Mira Trucking property from November 2017 to December 2018.

#### 3.1 Rental Home Property Potable Well Sampling

The following sections summarize the results and findings from the sampling of the potable well on the rental home property.

##### 3.1.1 Potable Well Sampling Data Usability

DESA analyzed and validated two residential well samples (influent and effluent), one field duplicate sample, and one trip blank sample collected on November 28, 2018 by CDM Smith. CDM Smith reviewed the narrative validation report from DESA to assess whether the project's data quality objectives were met.

One trip blank was collected and shipped with the field samples for VOC analysis. Analysis of the trip blank sample found a detection of one VOC (acetone at 19 micrograms per liter [ $\mu\text{g/L}$ ]). Concentrations detected in the potable well sampling are presented in Table 3-1. The full data table is provided in Appendix D. In the DESA data narrative validation report, no sample results were noted as qualified for trip blank detections. Acetone was detected in samples PW-1-EFF, PW-1-INF, and in the field duplicate sample PW-901-EFF at concentrations of 11, 24, and 17  $\mu\text{g/L}$ , respectively. These results are above the contract required quantitation limit (CRQL). The acetone results for samples PW-1-EFF and PW-901-EFF are below the concentration in the trip blank sample and should be considered as estimated biased low and possibly non-detect.

All data were validated by DESA and have been reviewed to assess whether data quality meets the data quality objectives and are sufficient to support project objectives. Some quality control (QC) parameters seemed to be outside criteria based on qualifiers presented for the samples in the data narrative validation report and the electronic data deliverable (EDD), but, with the exception of the raised CRQLs noted below, no QC outliers are noted in the report. Both the data narrative validation report and the associated EDD show some data are qualified non-detect (UJ, UL or U). These data are usable for project decisions. No sample results were rejected by DESA. Data validation reports are included in Appendix E.

The laboratory reporting limits for bromomethane, chloroethane, chloromethane, and methyl acetate were raised to 1  $\mu\text{g/L}$  due to problems associated with the initial calibration curve. The standard reporting limit is 0.5  $\mu\text{g/L}$ ; however, the elevated reporting limit is below the QAPP Project Action Limit.

Field duplicate results met the measurement performance criteria established in the QAPP.

The final percentages of valid data are 100 percent for the residential groundwater samples. No sample results were rejected by DESA; thus, the 90 percent completeness goal for valid data has been met. All planned samples were collected so the DQI goal of 90 percent completeness is met.

Data failing QC criteria are appropriately qualified and all data reported for the potable well sampling herein are usable with the data validation qualifiers applied. The data generated during the residential groundwater sampling event are considered definitive level data and are usable for the intended purpose, to confirm contamination concentrations in the potable well water at the rental home.

### 3.1.2 Potable Well Sampling Results

The concentrations detected in the potable well sampling at the rental home are presented in Table 3-1. The full data table is provided in Appendix D. The results indicate that concentrations of several metals, including aluminum, iron, manganese, and sodium, are present in either the influent or effluent at concentrations above the RI screening criteria. Lead, arsenic, vinyl chloride, tetrachloroethene, and trichloroethene, which were identified in groundwater on the Matteo OU1 site, were not detected above screening criteria in the rental home well water.

The influent sample (PW-1-INF) contained concentrations of aluminum, iron, and manganese greater than the RI screening criteria. Aluminum and manganese were detected at 240 and 59 µg/L, respectively. These concentrations are slightly greater than their RI screening criteria of 200 and 50 µg/L, respectively. Iron was detected at 2,200 µg/L, which is one order of magnitude greater than the iron RI screening criterion of 300 µg/L. Aluminum was not detected in the unfiltered influent sample during the initial RI in 2012, and manganese was detected at a concentration of 0.69 µg/L. Iron was detected at 38.3 µg/L in the unfiltered influent sample during the 2012 RI.

The effluent sample (PW-1-EFF) contained concentrations of aluminum and sodium greater than the RI screening criteria. Aluminum was detected at a concentration of 640 µg/L, and sodium was detected at a concentration of 80,000 µg/L. The sodium concentration was within the same order of magnitude as the sodium RI screening criterion of 50,000 µg/L. The concentrations in a duplicate sample collected at this location contained comparable concentrations. While an effluent sample was not collected during the 2012 RI, sodium was detected at a concentration greater than the RI screening criterion in the unfiltered influent sample at a concentration of 71,700 µg/L.

During the 2018 sampling, the concentrations of aluminum and sodium both increased from influent to effluent samples. The rental home contains a water softening unit to treat the water; therefore, it is likely the increase in sodium concentration is related to the water softening process, which removes ions that cause hard water (magnesium and calcium) by adding sodium ions. The water softening system may also remove iron as observed from the decrease in iron concentrations from the influent sample to the effluent sample. It is not clear what may have caused the increase in aluminum concentrations.

## 3.2 Mira Trucking Property Soil and Solid Waste Investigation

The following sections summarize the results and findings from the various phases of investigation on the Mira Trucking property.

### 3.2.1 Mira Trucking Data Usability

Based on information provided by Weston, Phase 1A soil samples were analyzed by Chemtech via CLP, while Phase 1A solid waste and battery casing samples were analyzed by Chemtech via subcontract agreement. Phase 1B soil samples were analyzed by DESA. Phase 2 soil and battery casing samples were analyzed by Chemtech via subcontract agreement.

All samples that were analyzed by Chemtech via CLP (Phase 1A soil samples) were validated by EPA. All samples that were analyzed by DESA (Phase 1B soil samples) were validated by DESA. The CLP and DESA case narratives for these samples are included as attachments to Weston's sampling reports and are provided in Appendices A and B. For all samples that were analyzed by Chemtech via subcontract agreement, Weston completed data assessment reports. Weston's data assessment reports are included as attachments to Weston's sampling reports and are provided in Appendices A and C.

The data assessment reports, EPA validation reports, and the DESA summaries provided in Appendices A through C stated, "all data were found to be valid and acceptable except those analytes which have been rejected, "R" (unusable). Due to various quality control problems, some analytes may have been qualified with a "J" (estimated), "N" (presumptive evidence for the presence of the material), "U" (non-detected), or "JN" (presumptive evidence for the presence of the material at an estimated value) flag. The "R" flag means that the associated value is unusable. In other words, significant data bias is evident and the reported analyte concentrations is unreliable." Rejected results were not provided to CDM Smith.

CDM Smith did not review the validation reports from EPA or DESA. The data assessment reports were also not reviewed against the provided data packages that were in the Weston report as that type of review was outside the scope of CDM Smith's activities. Weston is an EPA contractor, and as such, the Weston data were collected in accordance with the quality requirements established under the contract between Weston and EPA. Therefore, the Weston data should be usable to support EPA decisions. CDM Smith is using the data provided by Weston as reported for all three phases, except any rejected results, to inform decisions on the nature and extent of contamination on the Mira Trucking Property.

### 3.2.2 Phase 1A – November 2017 Removal Assessment and Remedial Investigation

Analytical results for the Phase 1A investigation on the Mira Trucking property are provided in Tables 2 through 10 in Appendix A.

#### 3.2.2.1 XRF Soil Screening Results

The results of the XRF screening found 69 of the 147 soil samples with lead concentrations greater than the New Jersey Non-Residential Direct Contact Soil Remediation Standard (NJNRDCSRS) (800 milligrams per kilogram [mg/kg]). Of the samples containing concentrations of lead greater than 800 mg/kg, most were collected from 0 to 18 inches bgs, indicating that



contamination is present mostly in surface soils. The deepest sample with a concentration of lead greater than 800 mg/kg was collected from 28 to 34 inches bgs at P001-TPF8, with a concentration of 49,700 mg/kg. This was the maximum concentration of lead observed during the XRF soil screening, and this location is immediately adjacent to the berm in an area with a high density of battery casing material.

In addition, 51 of the 69 samples with lead concentrations greater than 800 mg/kg were collected from areas where battery casing material was observed. Battery casing material was observed throughout Truck Staging Area 1, Truck Staging Area 2, and the wooded areas along the perimeter of the property. The highest density of battery casing material observed on the surface was present in the southern portion of Truck Staging Area 1, the northeast portion of Truck Staging Area 2, and the southeastern boundary of the property.

Weston performed a regression analysis to compare the lead screening results with the confirmatory lead analytical results. Based on the regression analysis, the coefficient of determination for lead was 0.89, indicating there is a strong correlation between the screening results and the analytical results.

### **3.2.2.2 Analytical Soil Sample Results**

As discussed in Section 2.2.1, 31 percent of the soil samples collected from the test pit investigation and the surface soil sampling were sent to Chemtech for confirmatory analyses for TAL metals. Of the 49 confirmatory soil samples analyzed for TAL metals, 35 samples contained concentrations of lead greater than 800 mg/kg. The maximum concentration of lead was 53,700 mg/kg, detected in P001-SS044-0002-01, located in Truck Staging Area 2. Most samples with lead concentrations greater than 800 mg/kg were collected in Truck Staging Area 1, Truck Staging Area 2, and the wooded area along the southeastern perimeter of the property, which, as previously discussed, are areas where battery casing material was observed.

Only one sample (P001-SS044-0002-01) had an antimony concentration (1,140 mg/kg) that was greater than the NJNRDCSRS of 450 mg/kg. The sample collected from this location also contained the maximum concentration of lead observed during the XRF screening and analytical sampling portion of the investigation.

### **3.2.2.3 Solid Waste Sampling Results**

As discussed in Section 2.2.1, solid waste samples were collected for the following analyses: TCL VOCs, SVOCs, PCBs, and pesticides; TAL metals; RCRA characteristics; and TCLP VOCs, SVOCs, pesticides, herbicides, and metals. Due to the nature and composition of the solid waste samples and the instrument sensitivity, the laboratory was unable to perform the analyses for TCL VOCs, SVOCs, PCBs, and pesticides for the solid waste samples.

Analytical results for TAL metals found that one of the three solid waste samples (P001-TPI1-SW03) contained a concentration of lead (1,050 mg/kg) greater than 800 mg/kg. Based on the results for TCLP metals, the same sample had a concentration of lead in leachate (19.6 milligram per liter [mg/L]) greater than the EPA TCLP maximum contaminant concentration (MCC) of 5 mg/L. Based on these results, only the solid waste collected from P001-TPI1-SW03 is considered a RCRA hazardous waste. P001-TPI1 is located within Truck Staging Area 2.

#### 3.2.2.4 Battery Casing Material Sampling Results

As discussed in Section 2.2.1, battery casing material samples were collected for total lead and TCLP metals analysis. All nine samples of battery casing material contained lead concentrations greater than 800 mg/kg. The maximum concentration of lead was 24,400 mg/kg, detected in P001-BC005-01.

All nine samples analyzed for TCLP metals contained concentrations of lead in leachate greater than the EPA TCLP MCC for lead. The maximum leachate lead concentration was 681 mg/L, detected in P001-BC005-01. Based on these results, the battery casing material is considered a RCRA hazardous waste.

#### 3.2.3 Phase 1B – April 2018 Residential Property Sampling

Analytical results for the Phase 1B investigation on the Mira Trucking property are provided in Table 2 in Appendix B.

Only one sample collected during the investigation contained lead at a concentration greater than the New Jersey Residential Direct Contact Soil Remediation Standard (NJRDCSRS) of 400 mg/kg. The sample was collected from 0 to 2 inches bgs from property P002, along the western boundary of the Mira Trucking property. The sample contained a lead concentration of 420 mg/kg.

#### 3.2.4 Phase 2 – December 2018 Removal Assessment and Remedial Investigation

Analytical results for the Phase 2 investigation on the Mira Trucking property are provided in Tables 2 through 6 in Appendix C.

##### 3.2.4.1 XRF Soil Screening Results

Based on the XRF screening results, the concentration of lead in soil samples was greater than 800 mg/kg in 160 of the 824 samples collected from the Mira Trucking property. The maximum concentration of lead was 100,000 mg/kg, detected in P001-SS148-1824-01, which is located in the southwestern area of Truck Staging Area 1. Samples with concentrations of lead greater than 800 mg/kg were collected at depths ranging from ground surface to 30 inches bgs. Of the 160 samples with lead concentrations greater than 800 mg/kg, 122 samples were collected from depth intervals where battery casing material was observed. The majority of the samples containing lead concentrations greater than 800 mg/kg were collected in Truck Staging Area 1 and in the retention basin located northeast of Truck Staging Area 1.

Based on XRF screening results on residential property P002, 3 of 18 soil samples contained lead at concentrations greater than 400 mg/kg. The maximum concentration of lead was detected on residential property P002 at a concentration of 521 mg/kg. All samples containing lead at concentrations greater than 400 mg/kg were collected from 0 to 2 inches bgs.

Weston performed a regression analysis to compare the lead screening results with the lead analytical results. Based upon the regression analysis, the coefficient of determination for lead was 0.57. However, after excluding five outliers (screening and analytical results with significantly high variability), the coefficient of determination for lead was 0.80. The five



screening and analytical results excluded from the linear regressions analysis had lead concentrations significantly greater than 800 mg/kg, ranging from 5,851 to 92,998 mg/kg.

#### **3.2.4.2 Analytical Soil Sample Results**

As discussed in Section 2.2.3, 25 percent of the samples collected for XRF screening were sent to Chemtech for analysis of TAL metals. A subset of these samples was also analyzed for TCL PCBs.

Concentrations of lead were greater than 800 mg/kg in 110 of the 225 soil samples. The maximum concentration of lead was 52,400 mg/kg, detected in the sample collected from P001-SS097-0206-01, which is located in the center of Truck Staging Area 1. Soil samples with concentrations of lead greater than 800 mg/kg were collected from depths ranging from the ground surface to 24 inches bgs.

Concentrations of antimony exceeded 450 mg/kg in 3 of 225 samples. The maximum concentration of antimony was 1,510 mg/kg, detected at P001-SS203-0002-01, which is located in the formerly wooded area south of Truck Staging Area 2. The three sample locations that contained concentrations of antimony greater than 450 mg/kg were collocated with concentrations of lead greater than 800 mg/kg.

Concentrations of Aroclor 1254 exceeded the NJNRDCSRS of 1,000 micrograms per kilogram ( $\mu\text{g/kg}$ ) for total PCBs in 4 of 26 soil samples. The maximum concentration of total PCBs was 2,100  $\mu\text{g/kg}$ , detected in P001-SS148-0612-01. The four sample locations that contained concentrations of Aroclor 1254 greater than 1,000  $\mu\text{g/kg}$  were collocated with concentrations of lead greater than 800 mg/kg.

None of the soil samples collected from residential property P002 contained concentrations of lead greater than the NJRDCSRS of 400 mg/kg.

#### **3.2.4.3 Battery Casing Material Results**

As discussed in Section 2.2.3, battery casing samples were submitted to Chemtech for analysis of total lead, antimony, TCL PCBs, and TLCP metals.

Nine of the 16 battery casing samples contained lead at concentrations greater than 800 mg/kg. The maximum concentration of lead (39,700 mg/kg) was detected in P001-BC0121-01. One of the 16 battery casing samples contained antimony at a concentration greater than 450  $\mu\text{g/kg}$ . Eight battery casing samples (P001-BC022-01, P001-BC018-01, P001-BC020-01, P001-BC024-01, P001-BC021-01, P001-BC016-01, P001-BC023-01, and P001-BC013-01) contained concentrations of one or more Aroclors at a concentration greater than 1,000  $\mu\text{g/kg}$  for total PCBs. Aroclor 1254 was the most common Aroclor detected at concentrations greater than 1,000  $\mu\text{g/kg}$ . Aroclor 1260 was detected in one sample greater than 1,000  $\mu\text{g/kg}$ . Six of eight samples with a concentration of total PCBs greater than 1,000  $\mu\text{g/kg}$  also contained lead at concentrations greater than 800 mg/kg.

Based on the results from the TCLP analysis, concentrations of lead in leachate were greater than the EPA TCLP MCC of 5 mg/L in all 16 samples of battery casing material. The maximum concentration of lead in leachate was 587 mg/L, detected in P001-BC024-01. Based on these results, the battery casing material is considered a RCRA hazardous waste.

### 3.2.5 Summary of Extent of Contamination at Mira Trucking

Data from each of the three Weston investigations were compiled and are presented in Figures 3-1 through 3-4 to highlight the overall extent of contamination at Mira Trucking and the adjacent residential properties. A summary of the overall extent of contamination on the Mira Trucking property is provided below.

#### 3.2.5.1 Extent of Contamination in Soil

Samples with concentrations of lead greater than 800 mg/kg are widespread throughout the property from 0 to 1 feet bgs as shown in Figure 3-1a. Lead concentrations are greater than 800 mg/kg in soils from 0 to 1 feet bgs in Truck Staging Area 1, Truck Staging Area 2, the residential building area in the northern corner, and the retention basin. While soils from 0 to 1 feet bgs in the forested area south and east of Truck Staging Area 2 are significantly less contaminated than the remainder of the property, there are some areas of soil in this forested area with concentrations of lead greater than 800 mg/kg.

Lead concentrations are generally lower in soils from 1 to 2 feet bgs, with concentrations of lead greater than 800 mg/kg in this depth interval limited to seven areas as shown in Figure 3-1b. The largest area of lead contamination from 1 to 2 feet bgs is in the formerly forested area immediately south of Truck Staging Area 1. The results for lead from 1 to 2 feet bgs are well correlated with areas of battery casings as shown by the results of the battery casing reconnaissance (see Figure 3 of Appendix C). The battery casing reconnaissance confirmed that, in general, soil with lead concentrations greater than 800 mg/kg from 1 to 2 feet bgs are present in areas where a moderate or significant density of battery casing material was observed.

Significantly less data are available for soils from 2 to 4 feet bgs. However, the data suggest that deeper contamination is limited to two areas as shown in Figure 3-1c. Both of these areas were identified in the battery casing reconnaissance as having a moderate or significant density of battery casing material.

There were few samples that contained contaminants other than lead at concentrations greater than the NJNRDCSRS. As previously discussed, concentrations of antimony and PCBs were greater than their respective NJNRDCSRS in a few samples and were generally collocated with areas of elevated lead concentrations. Concentrations of antimony were greater than 450 mg/kg in four samples (Figure 3-2), and concentrations of Aroclor 1254 were greater than 1,000 µg/kg in four samples (Figure 3-3).

Arsenic was the only other inorganic contaminant found at concentrations greater than the NJNRDCSRS (19 mg/kg). A total of 21 samples contained concentrations of arsenic greater than 19 mg/kg (Figure 3-4). Samples containing concentrations of antimony, Aroclor 1254, or arsenic greater than the NJNRDCSRS also contained concentrations of lead greater than the NJNRDCSRS.

#### 3.2.5.2 Extent of Contamination in Solid Waste

Three solid waste samples were collected during the investigation on the Mira Trucking property. The results found that only one of the solid waste samples contained lead at a concentration greater than 800 mg/kg. The concentration of lead in this sample was 1,050 mg/kg. TCLP analysis

of this sample found concentrations of lead in leachate greater than the EPA TCLP MCC of 5 mg/L, indicating that the solid waste encountered is a RCRA hazardous waste.

### **3.2.5.3 Extent of Contamination in Battery Casing Material**

Observations collected during battery casing reconnaissance events found that battery casing material is present throughout the Mira Trucking property. A high density of battery casing material was found in the southern portion of Truck Staging Area 1 and the southwestern portion of Truck Staging Area 2 as shown in Figure 3 in Appendix C. In general, battery casing material was found to consistently contain concentrations of lead greater than 800 mg/kg, indicating that the material is likely the source of the lead contamination in soil. Concentrations of total PCBs were greater than 1,000 µg/kg in several of the battery casing material samples. The TCLP analysis results indicate that the battery casing material is a RCRA hazardous waste.

### **3.2.6 Summary of Extent of Contamination on Adjacent Residential Properties**

No concentrations of lead greater than 400 mg/kg were detected in any of the samples collected from the residential properties bordering the eastern property boundary of Mira Trucking.

Property P002, located immediately to the west of Mira Trucking, is the only residential property where concentrations of lead greater than 400 mg/kg were observed. Lead concentrations were greater than 400 mg/kg in four samples collected from this property, with a maximum concentration of 521 mg/kg. These three samples were collected from the northern corner of the property, adjacent to the Mira Trucking property boundary (Figure 2a). Based on the results, it is likely the lead contamination on the property is limited to this area.

## Section 4

### Summary of Risk

#### 4.1 Human Health Risk

The human health screening levels identified by EPA Region 2 for lead for commercial (non-residential) and residential soil are 800 and 200 mg/kg, respectively. Mean concentrations of lead in surface soil at the Mira Trucking property and at the residential property P002 exceed their respective screening levels. Therefore, lead is identified as a human health chemical of potential concern (COPC) for these properties.

While additional contaminants had high concentrations relative to ARARs (i.e., arsenic, antimony, and PCBs), the elevated concentrations were all collocated with high lead results. Lead is considered the primary chemical of potential concern for this streamlined human health risk evaluation and the additional contaminants were not evaluated.

##### 4.1.1 Evaluation of Exposure to Lead at Mira Trucking Property

Exposures to lead are not evaluated using the same methods as those for other contaminants. EPA has not published conventional quantitative toxicity values for lead because available data suggest a negligible or possibly no threshold for adverse effects, even at exposure levels that might be considered background. However, the toxicokinetics of lead are well understood and indicate that lead is regulated based on the blood lead concentration. Blood lead concentration can be correlated with both exposure and adverse health effects. In lieu of evaluating risk using typical intake calculations and toxicity criteria, EPA developed models specifically to evaluate lead exposures. For this addendum, blood lead concentrations for the Mira Trucking property are estimated using the EPA adult lead methodology (ALM) model spreadsheet, version date 6/14/2017, for workers at the property. The ALM estimates exposures to lead and determines blood lead concentrations (PbBs) based on the exposure parameters used for a given receptor. The model is generally used to evaluate exposures to lead in a non-residential situation and evaluates the fetus of a worker of child-bearing age as the most sensitive receptor in non-residential settings. EPA's risk reduction goal for contaminated sites is that no more than 5% of the population of children exposed to lead will have blood lead concentrations greater than a specified blood lead level reference value. In response to Office of Land and Emergency Management (OLEM) Directive 9200.2-167 (EPA 2016), EPA Region 2 has recommended use of a target blood lead level of 5 µg/dL in the model, which is consistent with the Centers for Disease Control and Prevention reference value to identify children who have been exposed to lead.

Only validated analytical results for lead are used in this evaluation in accordance with the *Risk Assessment Guidance for Superfund Volume I* (EPA 1989). EPA guidance (EPA 1989) also notes that assessment of surface exposures will be more certain if samples are collected from the shallowest depth that can be practically obtained. The shallowest samples available from any sampling location (i.e., 101 samples from the 0-2 inch interval and 15 samples from the 0-6 inch interval) were used to calculate lead exposure point concentrations at the Mira Trucking property. Exposure to lead in surface soil at the Mira Trucking property is evaluated for current

and future workers because concentrations (mean of 4,100 mg/kg and maximum of 53,700 mg/kg of the validated analytical results for lead) exceed 800 mg/kg. ALM model default parameters for workers are used in this analysis along with the site-specific arithmetic mean concentration of lead in surface soil (4,100 mg/kg from the 116 confirmatory samples available from Phase 1 and 2 sampling at P001). Parameters used in the ALM model are presented in Appendix F.

The ALM predicted that the geometric mean PbB level for a worker at the Mira Trucking property would be 6.5 micrograms per deciliter ( $\mu\text{g}/\text{dL}$ ), that the 95th percentile PbB level for the fetus of a worker would be 15.4  $\mu\text{g}/\text{dL}$ , and that the probability that fetal PbB exceeds 5  $\mu\text{g}/\text{dL}$  is 60.6%. Based on the results of the ALM (Appendix F), lead in surface soil at the Mira Trucking property poses an elevated risk because more than 5% of the exposed populations could have blood lead concentrations that exceed the blood lead level reference value.

#### 4.1.2 Evaluation of Exposure to Lead at Residential Property

The ALM model does not address potential residential exposures. For this addendum, blood lead concentrations for the residential property (P002) are estimated using the integrated exposure uptake biokinetic (IEUBK) model for lead in children (IEUBKwin v1.1 build 11, February 2010).

The IEUBK model is generally used to evaluate exposures to lead for young children in a residential situation. Young children are the subpopulation of primary concern for lead exposure because they tend to (1) have higher exposures to lead in soil, dust, and paint, (2) absorb more of the lead that is ingested, and (3) are more sensitive to the toxic effects of lead than are older children or adults. Thus, protection of young children also will be protective of adults in the same environment.

The IEUBK model is a software package that allows the user to estimate, for a hypothetical child or population of children, a plausible distribution of blood lead concentrations centered on the geometric mean blood lead concentration predicted by the model from available information about children's exposure to lead (EPA 1994). EPA's risk reduction goal for contaminated sites is that no more than 5% of the population of children exposed to lead will have blood lead concentrations greater than a specified blood lead level reference value. In response to Office of Land and Emergency Management (OLEM) Directive 9200.2-167 (EPA 2016), EPA Region 2 has recommended use of a target blood lead level of 5  $\mu\text{g}/\text{dL}$  in the model, which is consistent with the Centers for Disease Control and Prevention reference value to identify children who have been exposed to lead.

Only validated analytical results for lead are used in this evaluation in accordance with the *Risk Assessment Guidance for Superfund Volume I* (EPA 1989). EPA Superfund Lead-Contaminated Residential Site Handbook (EPA 2003) recommends that lead risks be evaluated based on soil samples from a depth of 0-1 inch. The shallowest samples available from this area are from a depth of 0-2 inches; therefore, this depth interval was used to calculate lead exposure point concentrations at P002. Exposure to lead in surface soil at P002 is evaluated for current and future child residential receptors because concentrations (mean of 266 mg/kg and maximum of 420 mg/kg of the validated analytical results for lead) exceed 200 mg/kg. IEUBK model default parameters are used in this analysis along with the arithmetic mean site-specific arithmetic mean

concentration of lead in surface soil (266 mg/kg from the ten confirmatory samples available from the 0-2 inch bgs interval at P002). Consistent with guidance from EPA (OLEM Directive 9200.2-177, EPA 2017), the default age range in the IEUBK model was modified from 0–84 months to 12–72 months. Parameters used in the IEUBK model are presented in Appendix F.

Using all model defaults with exception of soil lead concentration, the IEUBK model predicted that 22% (shown in the figure in Appendix F as the area under the curve to the right of the vertical line, which represents 5 µg/dL) of the modeled child population, ages 12 to 72 months, would have blood lead levels that exceed 5 µg/dL. Based on the results of the IEUBK model (Appendix F), lead in surface soil at the residential property P002 poses an elevated risk because more than 5% of a population incidentally ingesting soil could have blood lead concentrations that exceed the blood lead level reference value.

## 4.2 Ecological Risk

Ecological evaluation of the Mira Trucking property is not warranted because the property is unlikely to provide habitat for ecological receptors. The location is a commercial property surrounded by mostly commercial and residential properties. Due to the current and expected future use of the property, along with the presence of gravel cover on a majority of the property, it does not have the proper characteristics to be defined as an “environmentally sensitive natural resource” per the Ecological Evaluation Technical Guidance developed by the New Jersey Department of Environmental Protection (New Jersey Department of Environmental Protection 2018).

Two limited portions of the Mira Trucking property are not gravel-covered or currently used for staging commercial trucks: the retention basin and a formerly heavily forested area. These areas are discussed below.

While the 14,000-square-foot retention basin is vegetated with grass and small shrubs, the area is surrounded by gravel-covered surfaces consistent with use for parking commercial trucks and is located within a commercial area. In addition, Weston noted that the retention basin was dry during site visits, indicating that the area rarely (if ever) has standing water present. Due to these physical characteristics, it is unlikely that this area would support wildlife. The retention basin does not discharge directly to a surface water body but rather has a storm drain that discharges to a storm sewer. However, there is a potential that the storm sewer discharges to one of the two nearby water bodies: Hessian Run or Woodbury Creek. Potential outfall areas will be considered during OU3.

The previously heavily forested area has minimal vegetation following the felling of more than 100 trees in August 2018 to make additional space for staging trucks. The removal of the trees was performed by the property owner and was not authorized by EPA. The surface is now almost entirely composed of wood chips, soil, and/or gravel, and the property owners plan to use the area for truck staging. The area is unlikely to support ecological receptors given the recent forest clearing and the subsequent lack of vegetation and/or habitat.

Due to the minimal habitat present on the Mira Trucking property, the potential for complete exposure pathways and risk to ecological receptors is limited and therefore no additional evaluation of ecological risk is warranted at this time.



## Section 5

# Summary and Recommendations

### 5.1 Conclusions

This section provides the key conclusions based on evaluation of the additional RI data collected.

- Several metals, including aluminum, iron, manganese, and sodium, are present in the potable well water on the rental home property at concentrations above the RI screening criteria. Lead, arsenic, vinyl chloride, tetrachloroethene, and trichloroethene, which were identified in groundwater on the Matteo OU1 site during the 2012 RI, were not detected above screening criteria in the rental home well water.
- Sufficient data were collected to confirm the presence of, and further delineate, the site-related contaminants, specifically lead, at the Mira Trucking property.
- Samples with lead concentrations greater than the 800 mg/kg are widespread throughout the Mira Trucking property from 0 to 1 feet bgs in Truck Staging Area 1, Truck Staging Area 2, the residential building area in the northern corner, and the retention basin and, to a lesser extent, in the forested area south and east of Truck Staging Area 2.
- Lead concentrations are generally lower in soils from 1 to 2 feet bgs and from 2 to 4 feet bgs compared to lead concentrations in soils from 0 to 1 foot bgs. Areas of lead concentrations greater than 800 mg/kg are collocated with areas of battery casing waste.
- The largest area of lead contamination from 1 to 2 feet bgs is in the formerly forested area immediately south of Truck Staging Area 1.
- Battery casing material was found to consistently contain concentrations of lead greater than 800 mg/kg, indicating the material is likely the source of the lead contamination in soil.
- TCLP analysis of battery casing material found that battery casings are a RCRA hazardous waste.
- Concentrations of antimony, total PCBs, and arsenic greater than the NJNRDCSRS in soil were generally found collocated with lead concentrations greater than the NJNRDCSRS.
- Lead concentrations greater than the NJRDCSRS in residential property soil were limited to one residential property in a corner of the property adjacent to the Mira Trucking property.

### 5.2 Recommendations

The data collected during these investigations are considered sufficient to support development of remedial alternatives in the feasibility study and preparation of a Record of Decision.



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## Section 6

### References

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Tables

**Table 3-1**  
**Rental Home Potable Well Sampling Results**  
**Matteo Sons, Inc. Site**  
**Thorofare, New Jersey**

Sample ID	Analyte	RI Screening Criteria	Result (µg/L)	Q
PW-1-INF	Acetone	6,000	24	
	Chloroform	70	2.9	
	Aluminum	200	<b>240</b>	
	Barium	2,000	64	
	Chromium	70	6.9	
	Copper	1,300	3.1	
	Iron	300	<b>2,200</b>	
	Lead	5	1.4	
	Manganese	50	<b>59</b>	
	Nickel	100	6.8	
	Sodium	50,000	44,000	
	Zinc	2,000	41	
	beta-BHC	0.04	0.011	J
PW-1-EFF	Acetone	6,000	11	
	2-Butanone	300	11	
	Chloroform	70	3.2	
	Aluminum	200	<b>640</b>	
	Chromium	70	1.4	
	Copper	1,300	9.9	
	Iron	300	110	
	Sodium	50,000	<b>80,000</b>	
	Zinc	2,000	96	
PW-1-EFF (duplicate)	Acetone	6,000	17	
	2-Butanone	300	9.4	
	Chloroform	70	3.1	
	Aluminum	200	<b>520</b>	
	Chromium	70	1.4	
	Copper	1,300	11	
	Iron	300	87	
	Sodium	50,000	<b>84,000</b>	
	Zinc	2,000	98	
	beta-BHC	0.04	0.013	J
	4,4'-DDT	0.1	0.0044	J

**Acronyms:**

ID - identification

Q - qualifier

J - result is estimated

NL - not listed

RI - remedial investigation

µg/L - microgram per liter

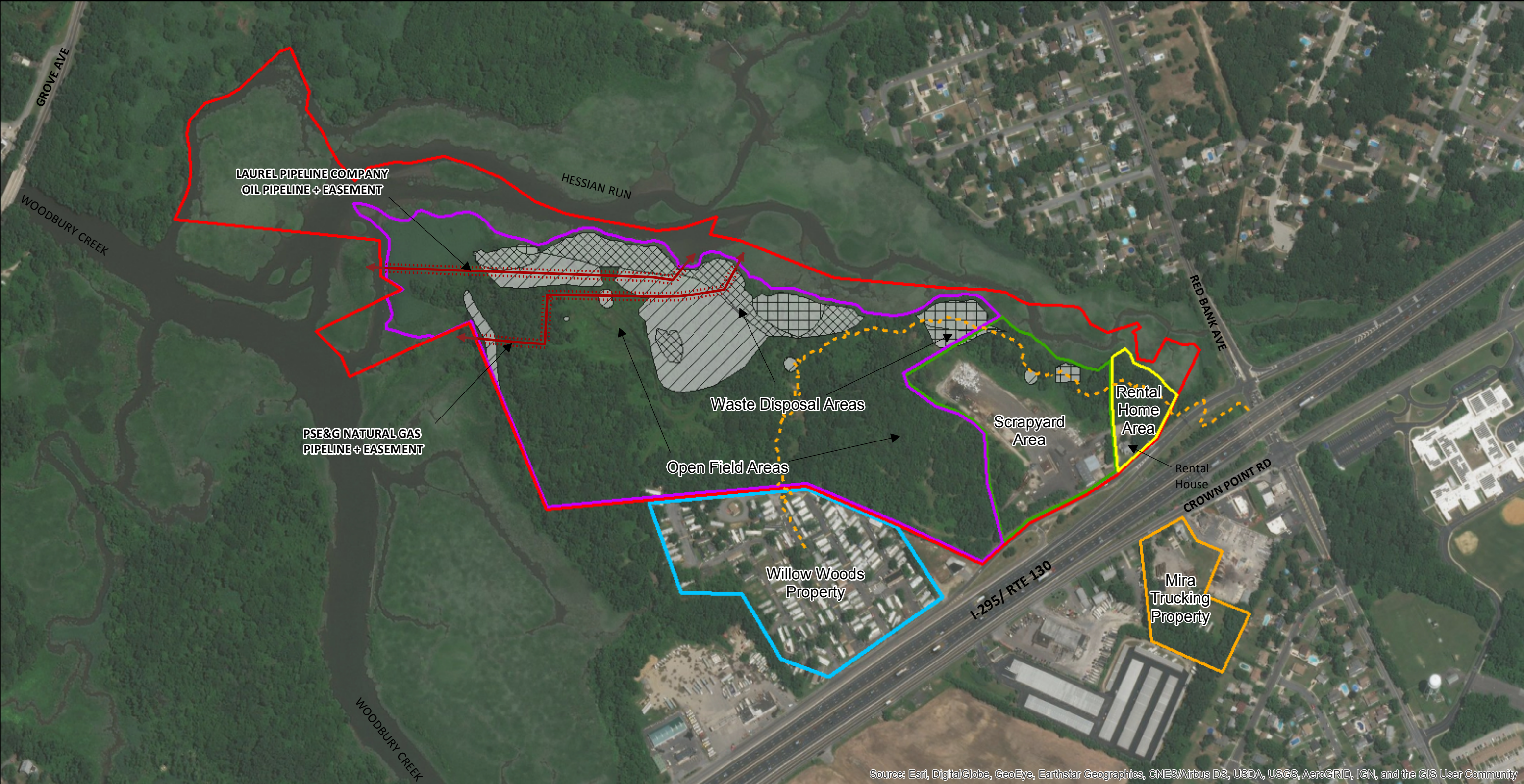
**Bold format and highlighting indicate that the result is greater than screening criteria.**












The New Jersey Groundwater Quality Standards were chosen as the screening criteria during the RI (CDM Smith 2018).

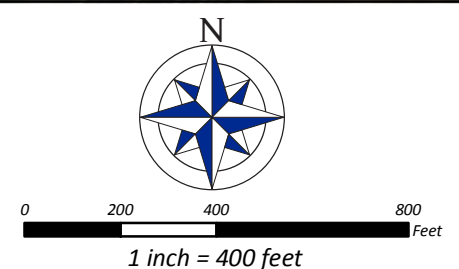


Figures





- |   |  |
|---|--|
|  Matteo Property                | <b>Delineated Waste Disposal Areas</b>   |
|  Scrapyard Area                 |  Battery Casings and Waste                  |
|  Open Field/Waste Disposal Area |  Battery Casings                            |
|  Rental Home Area               |  Municipal Waste                            |
|  Willow Woods Property          |  Approximate Extent of 100-Year Flood Event |
|  Mira Trucking Property         |  Utility Line                               |



**Figure 1-1**  
**Site Plan**  
**Matteo & Sons, Inc. Site**  
**Thorofare, NJ**







Samples from 0 to 2 feet bgs

- Matteo Property
- Mira Trucking Property
- Adjacent Residential Properties
- Parcel Boundaries
- P002 (Identified Property Boundary)



0 37.5 75 150 Feet

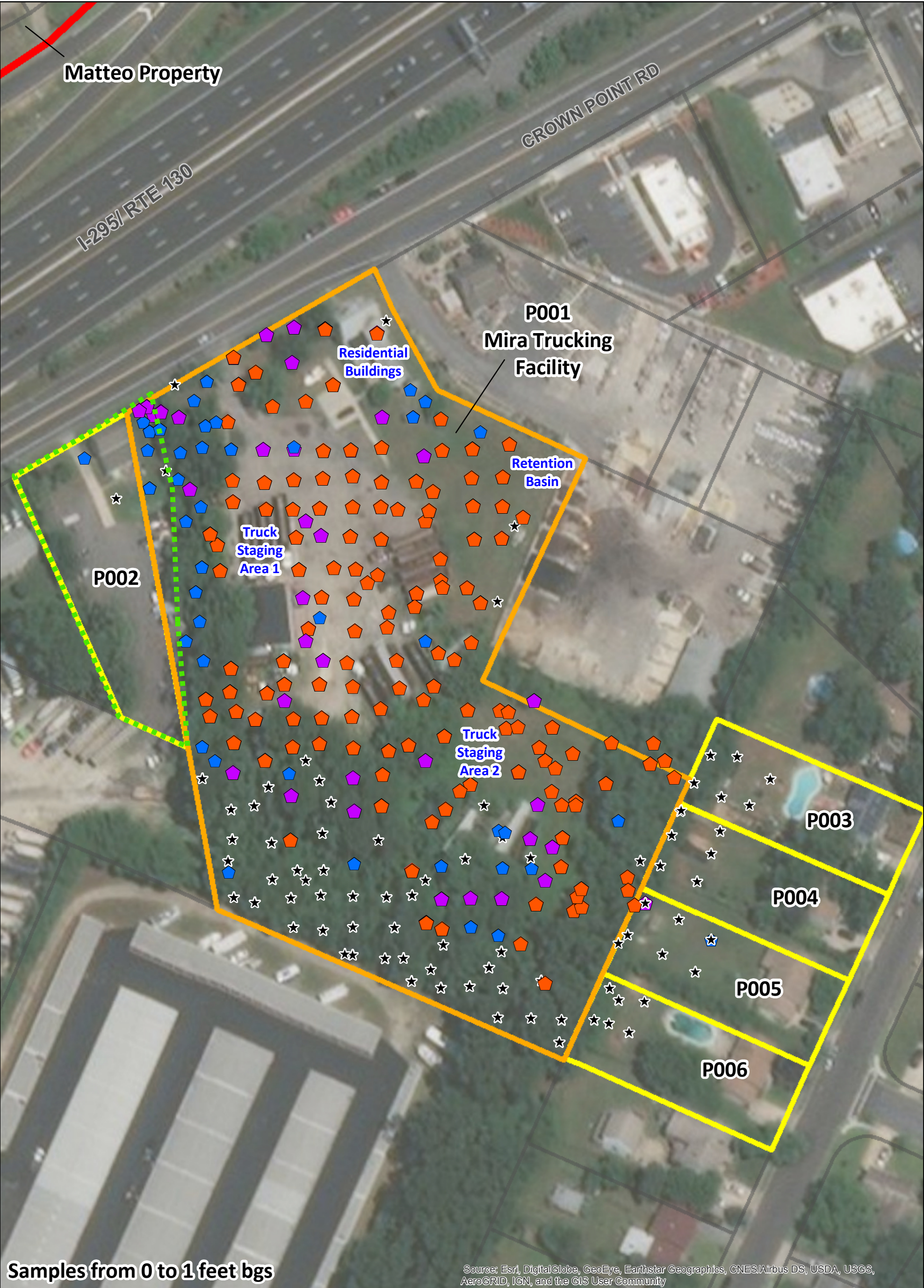
1 inch = 75 feet

Figure 1-2  
Site Map  
Matteo & Sons, Inc. Site  
Thorofare, NJ



**Notes**  
1. Previous EPA reports showed a property boundary consistent with property use but not consistent with tax maps.





Samples from 0 to 1 feet bgs

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

- Matteo Property
- Mira Trucking Property
- Adjacent Residential Properties
- Parcel Boundaries
- P002 (Identified Property)
- Boundary

Soil Sampling Results	
Lead (mg/kg)	
★	<200
◆	200 - 400
◆	400 - 800
◆	>800

Acronyms:  
EPA - Environmental Protection Agency  
mg/kg - milligram per kilogram  
XRF - x-ray fluorescence

- Notes
- Soil sampling results are presented for Phase 1 and Phase 2 EPA sampling.
  - XRF and laboratory sampling results are shown in mg/kg.
  - Previous EPA reports showed a property boundary consistent with property use but not consistent with tax maps.
  - NJRDCSRS - New Jersey Residential Direct Contact Soil Remediation Standard - 400 mg/kg  
NJRDCSRS - New Jersey Non-Residential Direct Contact Soil Remediation Standard - 800 mg/kg

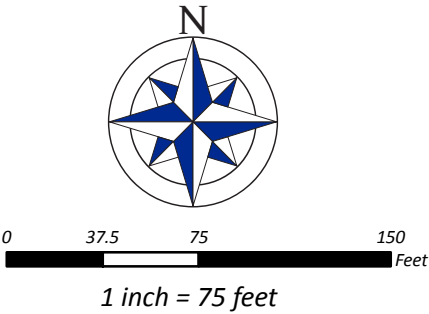


Figure 3-1a  
Extent of Lead Contamination from  
0 to 1 feet below ground surface  
Matteo & Sons, Inc. Site  
Thorofare, NJ







Samples from 1 to 2 feet bgs

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

- Matteo Property
- Mira Trucking Property
- Adjacent Residential Properties
- Parcel Boundaries
- P002 (Identified Property Boundary)

Soil Sampling Results	
Lead (mg/kg)	
★	<200
◆	200 - 400
◆	400 - 800
◆	>800

Acronyms:  
EPA - Environmental Protection Agency  
mg/kg - milligram per kilogram  
XRF - x-ray fluorescence

- Notes
- Soil sampling results are presented for Phase 1 and Phase 2 EPA sampling.
  - XRF and laboratory sampling results are shown in mg/kg.
  - Previous EPA reports showed a property boundary consistent with property use but not consistent with tax maps.
  - NJRDCSRS - New Jersey Residential Direct Contact Soil Remediation Standard - 400 mg/kg  
NJRDCSRS - New Jersey Non-Residential Direct Contact Soil Remediation Standard - 800 mg/kg



0 37.5 75 150 Feet

1 inch = 75 feet

Figure 3-1b  
Extent of Lead Contamination from  
1 to 2 feet below ground surface  
Matteo & Sons, Inc. Site  
Thorofare, NJ







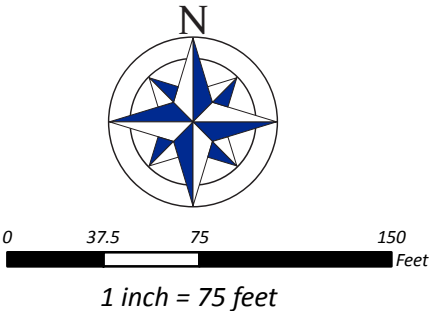
Samples from 2 to 4 feet bgs

- Matteo Property
- Mira Trucking Property
- Adjacent Residential Properties
- Parcel Boundaries
- P002 (Identified Property)
- Boundary

Soil Sampling Results	
Lead (mg/kg)	
★	<200
◆	200 - 400
◆	400 - 800
◆	>800

Acronyms:  
EPA - Environmental Protection Agency  
mg/kg - milligram per kilogram  
XRF - x-ray fluorescence

- Notes**
- Soil sampling results are presented for Phase 1 and Phase 2 EPA sampling.
  - XRF and laboratory sampling results are shown in mg/kg.
  - Previous EPA reports showed a property boundary consistent with property use but not consistent with tax maps.
  - NJRDCSRS - New Jersey Residential Direct Contact Soil Remediation Standard - 400 mg/kg
  - NJNRDCSRS - New Jersey Non-Residential Direct Contact Soil Remediation Standard - 800 mg/kg



**Figure 3-1c**  
**Extent of Lead Contamination from**  
**2 to 4 feet below ground surface**  
**Matteo & Sons, Inc. Site**  
**Thorofare, NJ**







Samples from 0 to 2 feet bgs

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

- Matteo Property
- Mira Trucking Property
- Adjacent Residential Properties
- Parcel Boundaries
- P002 (Identified Property Boundary)

**Soil Sampling Results**  
**Antimony (mg/kg)**  
★ < 31  
● 31 - 450  
● > 450

Acronyms:  
EPA - Environmental Protection Agency  
mg/kg - milligram per kilogram

- Notes**
- Soil sampling results are presented for Phase 1 and Phase 2 EPA sampling.
  - Previous EPA reports showed a property boundary consistent with property use but not consistent with tax maps.
  - NJRDCSRS - New Jersey Residential Direct Contact Soil Remediation Standard - 31 mg/kg  
NJNRDCSRS - New Jersey Non-Residential Direct Contact Soil Remediation Standard - 450 mg/kg



1 inch = 75 feet

**Figure 3-2**  
**Extent of Antimony Contamination from**  
**0 to 2 feet below ground surface**  
**Matteo & Sons, Inc. Site**  
**Thorofare, NJ**







Samples from 0 to 2 feet bgs

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

- Matteo Property
- Mira Trucking Property
- Adjacent Residential Properties
- Parcel Boundaries
- P002 (Identified Property Boundary)

**Soil Sampling Results**  
Total PCBs (µg/kg)  
★ <200  
● 200 - 1,000  
● > 1,000

Acronyms:  
EPA - Environmental Protection Agency  
µg/kg - microgram per kilogram

Notes

- Soil sampling results are presented for Phase 1 and Phase 2 EPA sampling.
- Previous EPA reports showed a property boundary consistent with property use but not consistent with tax maps.
- NJRDCSRS - New Jersey Residential Soil Remediation Standard - 200 µg/kg  
NJNRDCSRS - New Jersey Non-Residential Direct Contact Soil Remediation Standard - 1,000 µg/kg



1 inch = 75 feet

**Figure 3-3**  
**Extent of PCB Contamination from**  
**0 to 2 feet below ground surface**  
**Matteo & Sons, Inc. Site**  
**Thorofare, NJ**







Samples from 0 to 2 feet bgs

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

- Matteo Property
- Mira Trucking Property
- Adjacent Residential Properties
- Parcel Boundaries
- P002 (Identified Property)
- Boundary

**Soil Sampling Results**  
**Arsenic (mg/kg)**  
★ < 19  
⬢ > 19

Acronyms:  
EPA - Environmental Protection Agency  
mg/kg - milligram per kilogram



0 37.5 75 150  
Feet

1 inch = 75 feet

**Figure 3-4**  
**Extent of Arsenic Contamination from**  
**0 to 2 feet below ground surface**  
**Matteo & Sons, Inc. Site**  
**Thorofare, NJ**



**Notes**  
1. Soil sampling results are presented for Phase 1 and Phase 2 EPA sampling.  
2. Previous EPA reports showed a property boundary consistent with property use but not consistent with tax maps.  
3. NJRDCSRS - New Jersey Residential Direct Contact Soil Remediation Standard - 19 mg/kg  
NJRDCSRS - New Jersey Non-Residential Direct Contact Soil Remediation Standard - 19 mg/kg



# Appendix A

## Appendix A

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### Phase 1A Weston Sampling Report (Included on CD)



A decorative design featuring a vertical blue line on the left and a horizontal blue line intersecting it. In the bottom-left corner, there is a right-angled triangle with a blue-to-white gradient, its hypotenuse facing the bottom-left.

# Appendix B

## Appendix B

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### Phase 1B Weston Sampling Report (Included on CD)

# Appendix C

## Appendix C

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### Phase 2 Weston Sampling Report (Included on CD)

A decorative graphic consisting of a vertical blue line and a horizontal blue line intersecting. A square with a blue-to-white gradient is located in the bottom-left quadrant of the intersection.

# Appendix D

## Appendix D

# Rental Home Potable Well Sampling Analytical Results

**Appendix D - Table 1**  
**Rental Home Potable Well Sampling Results**  
**Matteo Sons, Inc. Site**  
**Thorofare, New Jersey**

		Location Sample ID Date		PW-1 PW-1-RIFS 1/16/2012	PW-1 PW-1-RIFS-X 12/15/2014	PW-1 PW-1-RIFS-F 1/16/2012	PW-1 PW-1-INF 11/28/2018	PW-1 PW-1-EFF 11/28/2018	PW-1 PW-901-EFF 11/28/2018
Cas No.	Chemical	Unit	RI Groundwater Screening Criteria						
<b>Volatile Organic Compounds</b>									
71-55-6	1,1,1-Trichloroethane	µg/L	30		0.5 U		0.5 U	0.5 U	0.5 U
79-34-5	1,1,2,2-Tetrachloroethane	µg/L	1		0.5 U		0.5 U	0.5 U	0.5 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L	---		0.5 U		0.5 U	0.5 U	0.5 U
79-00-5	1,1,2-Trichloroethane	µg/L	3		0.5 U		0.5 U	0.5 U	0.5 U
75-34-3	1,1-Dichloroethane	µg/L	50		0.5 U		0.5 U	0.5 U	0.5 U
75-35-4	1,1-Dichloroethene	µg/L	1		0.5 U		0.5 U	0.5 U	0.5 U
87-61-6	1,2,3-Trichlorobenzene	µg/L	---		0.5 U		0.5 U	0.5 U	0.5 U
120-82-1	1,2,4-Trichlorobenzene	µg/L	9		0.5 U		0.5 U	0.5 U	0.5 U
96-12-8	1,2-Dibromo-3-chloropropane	µg/L	0.02		0.05 U		0.5 U	0.5 U	0.5 U
106-93-4	1,2-Dibromoethane	µg/L	0.03		0.05 U		0.5 U	0.5 U	0.5 U
95-50-1	1,2-Dichlorobenzene	µg/L	600		0.5 U		0.5 U	0.5 U	0.5 U
107-06-2	1,2-Dichloroethane	µg/L	2		0.5 U		0.5 U	0.5 U	0.5 U
78-87-5	1,2-Dichloropropane	µg/L	1		0.5 U		0.5 UL	0.5 U	0.5 U
541-73-1	1,3-Dichlorobenzene	µg/L	600		0.5 U		0.5 U	0.5 U	0.5 U
106-46-7	1,4-Dichlorobenzene	µg/L	75		0.5 U		0.5 U	0.5 U	0.5 U
78-93-3	2-Butanone	µg/L	300		5 U		5 U	11	9.4
591-78-6	2-Hexanone	µg/L	300		5 U		5 UL	5 UL	5 UL
108-10-1	4-Methyl-2-pentanone	µg/L	---		5 U		5 UL	5 UL	5 UL
67-64-1	Acetone	µg/L	6000		5 U		24	11	17
71-43-2	Benzene	µg/L	1		0.5 U		0.5 U	0.5 U	0.5 U
74-97-5	Bromochloromethane	µg/L	---		0.5 U		0.5 U	0.5 U	0.5 U
75-27-4	Bromodichloromethane	µg/L	1		0.5 U		0.5 U	0.5 U	0.5 U
75-25-2	Bromoform	µg/L	4		0.5 U		0.5 U	0.5 U	0.5 U
74-83-9	Bromomethane	µg/L	10		0.5 U		1 U	1 U	1 U
75-15-0	Carbon Disulfide	µg/L	700		0.5 U		0.5 U	0.5 U	0.5 U
56-23-5	Carbon Tetrachloride	µg/L	1		0.5 U		0.5 U	0.5 U	0.5 U
108-90-7	Chlorobenzene	µg/L	50		0.5 U		0.5 U	0.5 U	0.5 U
75-00-3	Chloroethane	µg/L	5		0.5 U		1 U	1 U	1 U
67-66-3	Chloroform	µg/L	70		0.5 U		2.9	3.2	3.1
74-87-3	Chloromethane	µg/L	---		0.5 U		1 U	1.1	1
156-59-2	cis-1,2-Dichloroethene	µg/L	70		0.5 U		0.5 U	0.5 U	0.5 U
10061-01-5	cis-1,3-Dichloropropene	µg/L	1		0.5 U		0.5 U	0.5 U	0.5 U
110-82-7	Cyclohexane	µg/L	---		0.5 U		0.5 UL	0.5 U	0.5 U
124-48-1	Dibromochloromethane	µg/L	1		0.5 U		0.5 U	0.5 U	0.5 U
75-71-8	Dichlorodifluoromethane	µg/L	1000		0.5 U		0.5 UL	0.5 UL	0.5 UL
100-41-4	Ethylbenzene	µg/L	700		0.5 U		0.5 U	0.5 U	0.5 U
98-82-8	Isopropylbenzene	µg/L	700		0.5 U		0.5 U	0.5 U	0.5 U
179601-23-1	m,p-Xylene	µg/L	---		0.5 U		0.5 U	0.5 U	0.5 U
79-20-9	Methyl acetate	µg/L	7000		0.5 U		1 U	1 U	1 U
1634-04-4	Methyl tert-Butyl Ether	µg/L	70		0.5 U		0.5 U	0.5 U	0.5 U
108-87-2	Methylcyclohexane	µg/L	---		0.5 U		0.5 UL	0.5 U	0.5 U
75-09-2	Methylene Chloride	µg/L	3		0.5 U		0.5 U	0.5 U	0.5 U
95-47-6	o-Xylene	µg/L	---		0.5 U		0.5 U	0.5 U	0.5 U
100-42-5	Styrene	µg/L	100		0.5 U		0.5 UL	0.5 U	0.5 U
127-18-4	Tetrachloroethene	µg/L	1		0.5 U		0.5 U	0.5 U	0.5 U
108-88-3	Toluene	µg/L	600		0.5 U		0.5 U	0.5 U	0.5 U
156-60-5	trans-1,2-Dichloroethene	µg/L	100		0.5 U		0.5 U	0.5 U	0.5 U
10061-02-6	trans-1,3-Dichloropropene	µg/L	1		0.5 U		0.5 U	0.5 U	0.5 U
79-01-6	Trichloroethene	µg/L	1		0.5 U		0.5 U	0.5 U	0.5 U
75-69-4	Trichlorofluoromethane	µg/L	2000		0.5 U		0.5 U	0.5 U	0.5 U
75-01-4	Vinyl Chloride	µg/L	1		0.5 U		0.5 U	0.5 U	0.5 U

**Appendix D - Table 1**  
**Rental Home Potable Well Sampling Results**  
**Matteo Sons, Inc. Site**  
**Thorofare, New Jersey**

Location Sample ID Date			PW-1 PW-1-RIFS 1/16/2012	PW-1 PW-1-RIFS-X 12/15/2014	PW-1 PW-1-RIFS-F 1/16/2012	PW-1 PW-1-INF 11/28/2018	PW-1 PW-1-EFF 11/28/2018	PW-1 PW-901-EFF 11/28/2018
Cas No.	Chemical	Unit	RI Groundwater Screening Criteria					
<b>Semivolatile Organic Compounds</b>								
92-52-4	1,1'-Biphenyl	µg/L	400		5 U		5 U	5 U
95-94-3	1,2,4,5-Tetrachlorobenzene	µg/L	---		5 U		5 U	5 U
123-91-1	1,4-Dioxane	µg/L	10	0.31 J		2 UJ	2 UJ	2 UJ
108-60-1	2,2'-Oxybis(1-chloropropane)	µg/L	300		5 U	10 U	10 U	10 U
58-90-2	2,3,4,6-Tetrachlorophenol	µg/L	---		5 U		5 U	5 U
95-95-4	2,4,5-Trichlorophenol	µg/L	700		5 U		5 U	5 U
88-06-2	2,4,6-Trichlorophenol	µg/L	20		5 U		5 U	5 U
120-83-2	2,4-Dichlorophenol	µg/L	20		5 U		5 U	5 U
105-67-9	2,4-Dimethylphenol	µg/L	100		5 U	5 UJ	5 U	5 U
51-28-5	2,4-Dinitrophenol	µg/L	40		10 U	10 U	10 U	10 U
121-14-2	2,4-Dinitrotoluene	µg/L	10		5 U		5 U	5 U
606-20-2	2,6-Dinitrotoluene	µg/L	10		5 U		5 U	5 U
91-58-7	2-Chloronaphthalene	µg/L	600		5 U	5 UJ	5 U	5 U
95-57-8	2-Chlorophenol	µg/L	40		5 U		5 U	5 U
91-57-6	2-Methylnaphthalene	µg/L	30	0.1 U		5 UJ	5 U	5 U
95-48-7	2-Methylphenol	µg/L	---		5 U	10 UJ	10 U	10 U
88-74-4	2-Nitroaniline	µg/L	---		10 U		5 U	5 U
88-75-5	2-Nitrophenol	µg/L	---		5 U		5 U	5 U
91-94-1	3,3'-Dichlorobenzidine	µg/L	30		5 UJ	10 U	10 U	10 U
99-09-2	3-Nitroaniline	µg/L	---		10 U		10 U	10 U
534-52-1	4,6-Dinitro-2-methylphenol	µg/L	1		10 U	10 U	10 U	10 U
101-55-3	4-Bromophenyl-phenylether	µg/L	---		5 U		5 U	5 U
59-50-7	4-Chloro-3-methylphenol	µg/L	100		5 U		5 U	5 U
106-47-8	4-Chloroaniline	µg/L	30		5 U	10 U	10 U	10 U
7005-72-3	4-Chlorophenyl-phenylether	µg/L	---		5 U		5 U	5 U
106-44-5	4-Methylphenol	µg/L	---		5 U	10 UJ	10 U	10 U
100-01-6	4-Nitroaniline	µg/L	---		10 U		10 U	10 U
100-02-7	4-Nitrophenol	µg/L	---		10 U		10 U	10 U
83-32-9	Acenaphthene	µg/L	400	0.1 U		5 UJ	5 U	5 U
208-96-8	Acenaphthylene	µg/L	100	0.1 U		5 UJ	5 U	5 U
98-86-2	Acetophenone	µg/L	700		5 U	10 U	10 U	10 U
120-12-7	Anthracene	µg/L	2000	0.1 U		5 U	5 U	5 U
1912-24-9	Atrazine	µg/L	3		5 U	10 U	10 U	10 U
100-52-7	Benzaldehyde	µg/L	---		5 U		10 U	10 U
56-55-3	Benzo(a)anthracene	µg/L	0.1	0.1 U		5 U	5 U	5 U
50-32-8	Benzo(a)pyrene	µg/L	0.1	0.1 U		5 U	5 U	5 U
205-99-2	Benzo(b)fluoranthene	µg/L	0.2	0.1 U		5 U	5 U	5 U
191-24-2	Benzo(g,h,i)perylene	µg/L	100	0.1 U		5 U	5 U	5 U
207-08-9	Benzo(k)fluoranthene	µg/L	0.5	0.1 U		5 U	5 U	5 U
111-91-1	Bis(2-chloroethoxy)methane	µg/L	---		5 U		5 U	5 U
111-44-4	Bis(2-chloroethyl)ether	µg/L	7		5 U	10 U	10 U	10 U
117-81-7	Bis(2-ethylhexyl)phthalate	µg/L	3		5 U		5 U	5 U
85-68-7	Butylbenzylphthalate	µg/L	100		5 U		5 U	5 U
105-60-2	Caprolactam	µg/L	5000	1.3 J		10 U	10 U	10 U
86-74-8	Carbazole	µg/L	---		5 U		10 U	10 U
218-01-9	Chrysene	µg/L	5	0.1 U		5 U	5 U	5 U
53-70-3	Dibenzo(a,h)anthracene	µg/L	0.3	0.1 U		5 U	5 U	5 U
132-64-9	Dibenzofuran	µg/L	---		5 U		5 U	5 U
84-66-2	Diethylphthalate	µg/L	6000		5 U		5 U	5 U
131-11-3	Dimethylphthalate	µg/L	100		5 U		5 U	5 U
84-74-2	Di-n-butylphthalate	µg/L	700		5 U		5 U	5 U
117-84-0	Di-n-octylphthalate	µg/L	100		5 U		10 U	10 U



**Appendix D - Table 1**  
**Rental Home Potable Well Sampling Results**  
**Matteo Sons, Inc. Site**  
**Thorofare, New Jersey**

		Location Sample ID Date		PW-1 PW-1-RIFS 1/16/2012	PW-1 PW-1-RIFS-X 12/15/2014	PW-1 PW-1-RIFS-F 1/16/2012	PW-1 PW-1-INF 11/28/2018	PW-1 PW-1-EFF 11/28/2018	PW-1 PW-901-EFF 11/28/2018
Cas No.	Chemical	Unit	RI Groundwater Screening Criteria						
206-44-0	Fluoranthene	µg/L	300		0.1 U		10 U	10 U	10 U
86-73-7	Fluorene	µg/L	300		0.1 U		5 U	5 U	5 U
118-74-1	Hexachlorobenzene	µg/L	0.02		5 U		5 U	5 U	5 U
87-68-3	Hexachlorobutadiene	µg/L	1		5 U		5 U	5 U	5 U
77-47-4	Hexachlorocyclopentadiene	µg/L	40		5 U		10 U	10 U	10 U
67-72-1	Hexachloroethane	µg/L	7		5 U		5 U	5 U	5 U
193-39-5	Indeno(1,2,3-cd)pyrene	µg/L	0.2		0.1 U		5 U	5 U	5 U
78-59-1	Isophorone	µg/L	40		5 U		5 U	5 U	5 U
91-20-3	Naphthalene	µg/L	300		0.1 U		5 U	5 U	5 U
98-95-3	Nitrobenzene	µg/L	6		5 U		5 U	5 U	5 U
621-64-7	N-Nitroso-di-n-propylamine	µg/L	10		5 U		5 U	5 U	5 U
86-30-6	N-Nitrosodiphenylamine	µg/L	10		5 U		5 U	5 U	5 U
87-86-5	Pentachlorophenol	µg/L	0.3		0.2 U		10 U	10 U	10 U
85-01-8	Phenanthrene	µg/L	100		0.1 U		5 U	5 U	5 U
108-95-2	Phenol	µg/L	2000		5 U		10 U	10 U	10 U
129-00-0	Pyrene	µg/L	200		0.1 U		5 U	5 U	5 U
<b>Pesticides - PCBs</b>									
72-54-8	4,4'-DDD	µg/L	0.1		0.1 U		0.05 U	0.1 U	0.05 U
72-55-9	4,4'-DDE	µg/L	0.1		0.1 U		0.011 J	0.1 U	0.013 J
50-29-3	4,4'-DDT	µg/L	0.1		0.1 U		0.05 U	0.1 U	0.05 U
309-00-2	Aldrin	µg/L	0.04		0.05 U		0.05 U	0.05 U	0.05 U
319-84-6	alpha-BHC	µg/L	0.02		0.05 U		0.05 U	0.05 U	0.05 U
5103-71-9	alpha-Chlordane	µg/L	0.5		0.05 U		0.05 U	0.05 U	0.05 U
319-85-7	beta-BHC	µg/L	0.04		0.05 U		0.05 U	0.05 U	0.05 U
319-86-8	delta-BHC	µg/L	---		0.05 U		0.05 U	0.05 U	0.05 U
60-57-1	Dieldrin	µg/L	0.03		0.1 U		0.1 U	0.1 U	0.1 U
959-98-8	Endosulfan I	µg/L	40		0.05 U		0.1 U	0.05 U	0.1 U
33213-65-9	Endosulfan II	µg/L	40		0.1 U		0.1 U	0.1 U	0.1 U
1031-07-8	Endosulfan Sulfate	µg/L	40		0.1 U		0.1 U	0.1 U	0.1 U
72-20-8	Endrin	µg/L	2		0.1 U		0.1 U	0.1 U	0.1 U
7421-93-4	Endrin aldehyde	µg/L	---		0.1 U		0.1 U	0.1 U	0.1 U
53494-70-5	Endrin Ketone	µg/L	---		0.1 U		0.1 U	0.1 U	0.0044 J
58-89-9	gamma-BHC (Lindane)	µg/L	0.03		0.05 U		0.5 U	0.05 U	0.5 U
5103-74-2	gamma-Chlordane	µg/L	0.5		0.05 U		0.1 U	0.05 U	0.1 U
76-44-8	Heptachlor	µg/L	0.05		0.05 U		0.1 U	0.05 U	0.1 U
1024-57-3	Heptachlor Epoxide	µg/L	0.2		0.05 U		0.05 U	0.5 U	0.05 U
72-43-5	Methoxychlor	µg/L	40		0.0025 J		0.05 U	5 U	0.05 U
8001-35-2	Toxaphene	µg/L	2		5 U		5 U	0.05 U	5 U
12674-11-2	Aroclor 1016	µg/L	0.5		0.099 U		1 U	1 U	1 U
11104-28-2	Aroclor 1221	µg/L	0.5		0.099 U		1 U	1 U	1 U
11141-16-5	Aroclor 1232	µg/L	0.5		0.099 U		1 U	1 U	1 U
53469-21-9	Aroclor 1242	µg/L	0.5		0.099 U		1 U	1 U	1 U
12672-29-6	Aroclor 1248	µg/L	0.5		0.099 U		1 U	1 U	1 U
11097-69-1	Aroclor 1254	µg/L	0.5		0.099 U		1 U	1 U	1 U
11096-82-5	Aroclor 1260	µg/L	0.5		0.099 U		1 U	1 U	1 U
37324-23-5	Aroclor 1262	µg/L	0.5		0.099 U		1 U	1 U	1 U
Inorganics	Aroclor 1268	µg/L	0.5		0.099 U		1 U	1 U	1 U

**Appendix D - Table 1**  
**Rental Home Potable Well Sampling Results**  
**Matteo Sons, Inc. Site**  
**Thorofare, New Jersey**

		Location Sample ID Date		PW-1 PW-1-RIFS 1/16/2012	PW-1 PW-1-RIFS-X 12/15/2014	PW-1 PW-1-RIFS-F 1/16/2012	PW-1 PW-1-INF 11/28/2018	PW-1 PW-1-EFF 11/28/2018	PW-1 PW-901-EFF 11/28/2018
Cas No.	Chemical	Unit	RI Groundwater Screening Criteria						
<b>Matteo-Inorganics</b>									
7429-90-5	Aluminum	µg/L	200	20 UJ		20 U	240	640	520
7440-36-0	Antimony	µg/L	6	2 U		2 U	1 U	1 U	1 U
7440-38-2	Arsenic	µg/L	3	0.2 U		0.15 J	1 U	1 U	1 U
7440-39-3	Barium	µg/L	2000	10 U		10 U	64	1 U	1 U
7440-41-7	Beryllium	µg/L	1	1 U		1 U	1 U	1 U	1 U
7440-43-9	Cadmium	µg/L	4	0.25 U		0.25 U	1 U	1 U	1 U
7440-70-2	Calcium	µg/L	---	59.1 J		158 J	23000	100 U	100 U
18540-29-9	Chromium, Hexavalent	µg/L				10 U	10 U	10 U	10 U
7440-47-3	Chromium	µg/L	70	2 U		2 U	6.9	1.4	1.4
7440-48-4	Cobalt	µg/L	100	1 U		1 U	1 U	1 U	1 U
7440-50-8	Copper	µg/L	1300	2 U		0.76 J	3.1	9.9	11
7439-89-6	Iron	µg/L	300	38.3 J		200 U	2200	110	87
7439-92-1	Lead	µg/L	5	0.99 J		1 U	1.4	1 U	1 U
7439-95-4	Magnesium	µg/L	---	500 U		29 J	4400	100 U	100 U
7439-96-5	Manganese	µg/L	50	0.69 J		0.68 J	59	1 U	1 U
7439-97-6	Mercury	µg/L	2	0.22		0.22	0.2 U	0.2 U	0.2 U
7440-02-0	Nickel	µg/L	100	1 U		1 U	6.8	1 U	1 U
7440-09-7	Potassium	µg/L	---	1830 J		1710	5500	190	190
7782-49-2	Selenium	µg/L	40	5 U		5 U	1 U	1 U	1 U
7440-22-4	Silver	µg/L	40	1 U		1 U	1 U	1 U	1 U
7440-23-5	Sodium	µg/L	50000	71700		91300	44000	80000	84000
7440-28-0	Thallium	µg/L	2	0.5 U		0.5 U	1 U	1 U	1 U
7440-62-2	Vanadium	µg/L	---	5 U		5 U	1 U	1 U	1 U
7440-66-6	Zinc	µg/L	2000	87.9 J		15.7	41	96	98
7664-41-7	Ammonia	µg/L	---	0.1					
24959-67-9	Bromide	µg/L	---	0.11					
16887-00-6	Chloride	µg/L	---	24					
57-12-5	Cyanide	µg/L	100	2.2 J			10 U	10 U	10 U
74-84-0	Ethane	µg/L	---	2 U					
74-85-1	Ethene	µg/L	---	2 U					
74-82-8	Methane	µg/L	---	36 K					
<b>Matteo-Wet Chemistry</b>									
TKN	Nitrogen, Total Kjeldahl	mg/L	---	0.12					
7727-37-9	Nitrogen, Total Kjeldahl	mg/L	---	0.05 U					
14265-44-2	Orthophosphate	mg/L	---	0.086					
14808-79-8	Sulfate	mg/L	---	44					
18496-25-8	Sulfide	mg/L	---	0.034					
ALK	Total Alkalinity	mg/L	---	120					
TDS	Total Dissolved Solids	mg/L	---	280					
TOC	Total Organic Carbon	mg/L	---	1.2					
TSS	Total Suspended Solids	mg/L	---	10 U					

**Acronyms:**

J - estimated  
mg/L - milligram per liter  
RI - remedial investigation  
U - non-detect  
UJ - non-detect, estimated  
UL - non-detect, biased low  
µg/L - micrograms per liter

**Bold format and highlighting indicate that the result is greater than screening criteria.**

The New Jersey Groundwater Quality Standards were chosen as the screening criteria during the RI (CDM Smith 2018).

# Appendix E

## Appendix E

# Rental Home Potable Well Sampling Validation Reports



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**

**Region 2 Laboratory  
2890 Woodbridge Avenue  
Edison , New Jersey 08837  
732-906-6886 Phone  
732-906-6165 Fax**

January 02, 2019

Vanessa Macwan  
CDM Smith  
110 Fieldcrest Avenue, 6th Floor  
Edison, NJ 08837

RE: Matteo & Sons - 1811047

Enclosed are the results of analyses for samples received by the laboratory on 11/28/2018. The signature below reflects the laboratory's approval of the reported results. If you have any questions concerning this report, please refer to Project Number 1811047 and contact the laboratory.

Sincerely,

A handwritten signature in black ink, which appears to read "John R. Bourbon". The signature is fluid and cursive, written in a professional style.

John R. Bourbon  
Chief, DESA/LB



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**  
**Region 2 Laboratory**

**Final Report**

**Project: Matteo & Sons - 1811047**

**Project Number: 1811047**

**Project Narrative:**

The National Environmental Laboratory Accreditation Conference Institute (TNI) is a voluntary environmental laboratory accreditation association of State and Federal agencies. TNI established and promoted a National Environmental Laboratory Accreditation Program (NELAP) that provides a uniform set of standards for the generation of environmental data that are of known and defensible quality. The EPA Region 2 Laboratory is NELAP accredited. The Laboratory tests that are accredited have met all the requirements established under the TNI Standards.

**Condition Comments**

None

**Comment(s):**

The "Sample Analysis Date and Time" is included in the results section for any analyte with a prescribed holding time of 72 hours or less.

**Data Qualifier(s):**

- U- The analyte was not detected at or above the Reporting Limit.
- J- The identification of the analyte is acceptable; the reported value is an estimate.
- K- The identification of the analyte is acceptable; the reported value may be biased high.
- L- The identification of the analyte is acceptable; the reported value may be biased low.
- NJ- There is presumptive evidence that the analyte is present; the analyte is reported as a tentative identification. The reported value is an estimate.

**Reporting Limit(s):**

The Laboratory was able to achieve the appropriate limits for each analyte requested, except for:

Trace Volatile Organic Compounds: The CRQL for Chloromethane, Bromomethane, Chloroethane, and Methyl Acetate in water is 0.50 ug/L. The Laboratory Reporting Limit (RL) was raised due to problems associated with the initial calibration curve in all samples.



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**  
**Region 2 Laboratory**

**Final Report**  
**Project: Matteo & Sons - 1811047**  
**Project Number: 1811047**

**SUMMARY REPORT FOR SAMPLES**

Field ID	Laboratory ID	Matrix	Date Sampled	Date Received
PW-1-EFF	1811047-01	Aqueous	11/28/2018 12:00	11/28/2018 16:30
PW-1-INF	1811047-02	Aqueous	11/28/2018 11:30	11/28/2018 16:30
PW-901-EFF	1811047-03	Aqueous	11/28/2018 12:10	11/28/2018 16:30
TB-112818	1811047-04	Aqueous	11/28/2018 10:45	11/28/2018 16:30



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**  
**Region 2 Laboratory**

**Final Report**

**Project: Matteo & Sons - 1811047**

**Project Number: 1811047**

**SUMMARY REPORT FOR METHODS**

<b>Analysis</b>	<b>Method</b>	<b>Certification</b>	<b>Matrix</b>
Chromium, Hexavalent	HACH 8023 SOP C-96 Rev 2.6	NELAP	Aqueous
Cyanide, Total	EPA 335.4 SOP C-28 Rev 2.6	NELAP	Aqueous
E-Mercury CVAA	EPA 245.1 SOP C-110 Rev 2.5	NELAP	Aqueous
E-Metals ICPMS TAL	EPA 200.8 SOP C-112 Rev 3.6	NELAP	Aqueous
E-VOA TRACE/SF	EPA DW-1 Rev 2.6	NELAP	Aqueous





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
Region 2 Laboratory

Final Report

Project: Matteo & Sons - 1811047

Project Number: 1811047

Analyte	Result	Qualifier	Reporting Limit	Units	Date and Time of Analysis*
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Field ID: PW-1-EFF

Sample ID: 1811047-01

VOA-TRACE GCMS

Dichlorodifluoromethane	---	U L	0.50	ug/L
Chloromethane	1.1		1.0	ug/L
Vinyl Chloride	---	U J	0.50	ug/L
Bromomethane	---	U	1.0	ug/L
Chloroethane	---	U	1.0	ug/L
Trichlorofluoromethane	---	U	0.50	ug/L
1,1-Dichloroethene	---	U	0.50	ug/L
1,1,2-Trichloro-1,2,2-Trifluoroethane	---	U	0.50	ug/L
Carbon Disulfide	---	U	0.50	ug/L
Acetone	11		5.0	ug/L
Methyl Acetate	---	U	1.0	ug/L
Methylene Chloride	---	U	0.50	ug/L
trans-1,2-Dichloroethene	---	U	0.50	ug/L
Methyl tert-Butyl Ether	---	U	0.50	ug/L
1,1-Dichloroethane	---	U	0.50	ug/L
cis-1,2-Dichloroethene	---	U	0.50	ug/L
2-Butanone	11		5.0	ug/L
Bromochloromethane	---	U	0.50	ug/L
Chloroform	3.2		0.50	ug/L
1,1,1-Trichloroethane	---	U	0.50	ug/L
Cyclohexane	---	U	0.50	ug/L
Carbon Tetrachloride	---	U	0.50	ug/L
Benzene	---	U	0.50	ug/L
1,2-Dichloroethane	---	U	0.50	ug/L
Trichloroethene	---	U	0.50	ug/L
1,2-Dichloropropane	---	U	0.50	ug/L
Bromodichloromethane	---	U	0.50	ug/L
cis-1,3-Dichloropropene	---	U	0.50	ug/L



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
Region 2 Laboratory

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Analyte	Result	Qualifier	Reporting Limit	Units	Date and Time of Analysis*
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Field ID: PW-1-EFF

Sample ID: 1811047-01

VOA-TRACE GCMS

4-Methyl-2-Pentanone	---	U L	5.0	ug/L
Toluene	---	U	0.50	ug/L
trans-1,3-Dichloropropene	---	U	0.50	ug/L
1,1,2-Trichloroethane	---	U	0.50	ug/L
Tetrachloroethene	---	U	0.50	ug/L
Methylcyclohexane	---	U	0.50	ug/L
Dibromochloromethane	---	U	0.50	ug/L
1,2-Dibromoethane	---	U	0.50	ug/L
2-Hexanone	---	U L	5.0	ug/L
Chlorobenzene	---	U	0.50	ug/L
Ethylbenzene	---	U	0.50	ug/L
m,p-Xylene	---	U	0.50	ug/L
o-Xylene	---	U	0.50	ug/L
Styrene	---	U	0.50	ug/L
Bromoform	---	U	0.50	ug/L
Isopropylbenzene	---	U	0.50	ug/L
1,1,2,2-Tetrachloroethane	---	U	0.50	ug/L
1,3-Dichlorobenzene	---	U	0.50	ug/L
1,4-Dichlorobenzene	---	U	0.50	ug/L
1,2-Dichlorobenzene	---	U	0.50	ug/L
1,2-Dibromo-3-Chloropropane	---	U	0.50	ug/L
1,2,4-Trichlorobenzene	---	U	0.50	ug/L
1,2,3-Trichlorobenzene	---	U	0.50	ug/L
Furan, tetrahydro-	5.9	NJ		ug/L
Sulfur Dioxide	3.6	NJ		ug/L



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
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Project Number: 1811047

Analyte	Result	Qualifier	Reporting Limit	Units	Date and Time of Analysis*
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Field ID: PW-1-EFF

Sample ID: 1811047-01

**Metals ICPMS**

Aluminum	640		20	ug/L
Antimony	---	U	1.0	ug/L
Arsenic	---	U	1.0	ug/L
Barium	---	U	1.0	ug/L
Beryllium	---	U	1.0	ug/L
Cadmium	---	U	1.0	ug/L
Calcium	---	U	100	ug/L
Chromium	1.4		1.0	ug/L
Cobalt	---	U	1.0	ug/L
Copper	9.9		1.0	ug/L
Iron	110		20	ug/L
Lead	---	U	1.0	ug/L
Magnesium	---	U	100	ug/L
Manganese	---	U	1.0	ug/L
Nickel	---	U	1.0	ug/L
Potassium	190		100	ug/L
Selenium	---	U	1.0	ug/L
Silver	---	U	1.0	ug/L
Sodium	80000		100	ug/L
Thallium	---	U	1.0	ug/L
Vanadium	---	U	1.0	ug/L
Zinc	96		2.0	ug/L

**Mercury CVAA**

Mercury	---	U	0.20	ug/L
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Project Number: 1811047

Analyte	Result	Qualifier	Reporting Limit	Units	Date and Time of Analysis*
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Field ID: PW-1-EFF

Sample ID: 1811047-01

Sanitary

Chromium, Hexavalent	---	U	10	ug/L	11/29/2018 9:14:00AM
Cyanide, Total	---	U	10	ug/L	

Field ID: PW-1-INF

Sample ID: 1811047-02

VOA-TRACE GCMS

Dichlorodifluoromethane	---	U L	0.50	ug/L	
Chloromethane	---	U	1.0	ug/L	
Vinyl Chloride	---	U J	0.50	ug/L	
Bromomethane	---	U	1.0	ug/L	
Chloroethane	---	U	1.0	ug/L	
Trichlorofluoromethane	---	U	0.50	ug/L	
1,1-Dichloroethene	---	U	0.50	ug/L	
1,1,2-Trichloro-1,2,2-Trifluoroethane	---	U	0.50	ug/L	
Carbon Disulfide	---	U	0.50	ug/L	
Acetone	24		5.0	ug/L	
Methyl Acetate	---	U	1.0	ug/L	
Methylene Chloride	---	U	0.50	ug/L	
trans-1,2-Dichloroethene	---	U	0.50	ug/L	
Methyl tert-Butyl Ether	---	U	0.50	ug/L	
1,1-Dichloroethane	---	U	0.50	ug/L	
cis-1,2-Dichloroethene	---	U	0.50	ug/L	
2-Butanone	---	U	5.0	ug/L	
Bromochloromethane	---	U	0.50	ug/L	
Chloroform	2.9		0.50	ug/L	
1,1,1-Trichloroethane	---	U	0.50	ug/L	
Cyclohexane	---	U L	0.50	ug/L	
Carbon Tetrachloride	---	U	0.50	ug/L	
Benzene	---	U	0.50	ug/L	
1,2-Dichloroethane	---	U	0.50	ug/L	



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Project Number: 1811047

Analyte	Result	Qualifier	Reporting Limit	Units	Date and Time of Analysis*
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Field ID: PW-1-INF

Sample ID: 1811047-02

VOA-TRACE GCMS

Trichloroethene	---	U	0.50	ug/L
1,2-Dichloropropane	---	U L	0.50	ug/L
Bromodichloromethane	---	U	0.50	ug/L
cis-1,3-Dichloropropene	---	U	0.50	ug/L
4-Methyl-2-Pentanone	---	U L	5.0	ug/L
Toluene	---	U	0.50	ug/L
trans-1,3-Dichloropropene	---	U	0.50	ug/L
1,1,2-Trichloroethane	---	U	0.50	ug/L
Tetrachloroethene	---	U	0.50	ug/L
Methylcyclohexane	---	U L	0.50	ug/L
Dibromochloromethane	---	U	0.50	ug/L
1,2-Dibromoethane	---	U	0.50	ug/L
2-Hexanone	---	U L	5.0	ug/L
Chlorobenzene	---	U	0.50	ug/L
Ethylbenzene	---	U	0.50	ug/L
m,p-Xylene	---	U	0.50	ug/L
o-Xylene	---	U	0.50	ug/L
Styrene	---	U L	0.50	ug/L
Bromoform	---	U	0.50	ug/L
Isopropylbenzene	---	U	0.50	ug/L
1,1,2,2-Tetrachloroethane	---	U	0.50	ug/L
1,3-Dichlorobenzene	---	U	0.50	ug/L
1,4-Dichlorobenzene	---	U	0.50	ug/L
1,2-Dichlorobenzene	---	U	0.50	ug/L
1,2-Dibromo-3-Chloropropane	---	U	0.50	ug/L
1,2,4-Trichlorobenzene	---	U	0.50	ug/L
1,2,3-Trichlorobenzene	---	U	0.50	ug/L



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Project Number: 1811047

Analyte	Result	Qualifier	Reporting Limit	Units	Date and Time of Analysis*
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Field ID: PW-1-INF

Sample ID: 1811047-02

**Metals ICPMS**

Aluminum	240		20	ug/L
Antimony	---	U	1.0	ug/L
Arsenic	---	U	1.0	ug/L
Barium	64		1.0	ug/L
Beryllium	---	U	1.0	ug/L
Cadmium	---	U	1.0	ug/L
Calcium	23000		100	ug/L
Chromium	6.9		1.0	ug/L
Cobalt	---	U	1.0	ug/L
Copper	3.1		1.0	ug/L
Iron	2200		20	ug/L
Lead	1.4		1.0	ug/L
Magnesium	4400		100	ug/L
Manganese	59		1.0	ug/L
Nickel	6.8		1.0	ug/L
Potassium	5500		100	ug/L
Selenium	---	U	1.0	ug/L
Silver	---	U	1.0	ug/L
Sodium	44000		100	ug/L
Thallium	---	U	1.0	ug/L
Vanadium	---	U	1.0	ug/L
Zinc	41		2.0	ug/L

**Mercury CVAA**

Mercury	---	U	0.20	ug/L
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Analyte	Result	Qualifier	Reporting Limit	Units	Date and Time of Analysis*
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Field ID: PW-1-INF

Sample ID: 1811047-02

Sanitary

Chromium, Hexavalent	---	U	10	ug/L	11/29/2018 9:14:00AM
Cyanide, Total	---	U	10	ug/L	

Field ID: PW-901-EFF

Sample ID: 1811047-03

VOA-TRACE GCMS

Dichlorodifluoromethane	---	U L	0.50	ug/L	
Chloromethane	1.0		1.0	ug/L	
Vinyl Chloride	---	U J	0.50	ug/L	
Bromomethane	---	U	1.0	ug/L	
Chloroethane	---	U	1.0	ug/L	
Trichlorofluoromethane	---	U	0.50	ug/L	
1,1-Dichloroethene	---	U	0.50	ug/L	
1,1,2-Trichloro-1,2,2-Trifluoroethane	---	U	0.50	ug/L	
Carbon Disulfide	---	U	0.50	ug/L	
Acetone	17		5.0	ug/L	
Methyl Acetate	---	U	1.0	ug/L	
Methylene Chloride	---	U	0.50	ug/L	
trans-1,2-Dichloroethene	---	U	0.50	ug/L	
Methyl tert-Butyl Ether	---	U	0.50	ug/L	
1,1-Dichloroethane	---	U	0.50	ug/L	
cis-1,2-Dichloroethene	---	U	0.50	ug/L	
2-Butanone	9.4		5.0	ug/L	
Bromochloromethane	---	U	0.50	ug/L	
Chloroform	3.1		0.50	ug/L	
1,1,1-Trichloroethane	---	U	0.50	ug/L	
Cyclohexane	---	U	0.50	ug/L	
Carbon Tetrachloride	---	U	0.50	ug/L	
Benzene	---	U	0.50	ug/L	



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Analyte	Result	Qualifier	Reporting Limit	Units	Date and Time of Analysis*
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Field ID: PW-901-EFF

Sample ID: 1811047-03

VOA-TRACE GCMS

1,2-Dichloroethane	---	U	0.50	ug/L
Trichloroethene	---	U	0.50	ug/L
1,2-Dichloropropane	---	U	0.50	ug/L
Bromodichloromethane	---	U	0.50	ug/L
cis-1,3-Dichloropropene	---	U	0.50	ug/L
4-Methyl-2-Pentanone	---	U L	5.0	ug/L
Toluene	---	U	0.50	ug/L
trans-1,3-Dichloropropene	---	U	0.50	ug/L
1,1,2-Trichloroethane	---	U	0.50	ug/L
Tetrachloroethene	---	U	0.50	ug/L
Methylcyclohexane	---	U	0.50	ug/L
Dibromochloromethane	---	U	0.50	ug/L
1,2-Dibromoethane	---	U	0.50	ug/L
2-Hexanone	---	U L	5.0	ug/L
Chlorobenzene	---	U	0.50	ug/L
Ethylbenzene	---	U	0.50	ug/L
m,p-Xylene	---	U	0.50	ug/L
o-Xylene	---	U	0.50	ug/L
Styrene	---	U	0.50	ug/L
Bromoform	---	U	0.50	ug/L
Isopropylbenzene	---	U	0.50	ug/L
1,1,2,2-Tetrachloroethane	---	U	0.50	ug/L
1,3-Dichlorobenzene	---	U	0.50	ug/L
1,4-Dichlorobenzene	---	U	0.50	ug/L
1,2-Dichlorobenzene	---	U	0.50	ug/L
1,2-Dibromo-3-Chloropropane	---	U	0.50	ug/L
1,2,4-Trichlorobenzene	---	U	0.50	ug/L
1,2,3-Trichlorobenzene	---	U	0.50	ug/L



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
Region 2 Laboratory

Final Report

Project: Matteo & Sons - 1811047

Project Number: 1811047

Analyte	Result	Qualifier	Reporting Limit	Units	Date and Time of Analysis*
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Field ID: PW-901-EFF

Sample ID: 1811047-03

VOA-TRACE GCMS

Furan, tetrahydro-	4.2	NJ		ug/L
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Metals ICPMS

Aluminum	520		20	ug/L
Antimony	---	U	1.0	ug/L
Arsenic	---	U	1.0	ug/L
Barium	---	U	1.0	ug/L
Beryllium	---	U	1.0	ug/L
Cadmium	---	U	1.0	ug/L
Calcium	---	U	100	ug/L
Chromium	1.4		1.0	ug/L
Cobalt	---	U	1.0	ug/L
Copper	11		1.0	ug/L
Iron	87		20	ug/L
Lead	---	U	1.0	ug/L
Magnesium	---	U	100	ug/L
Manganese	---	U	1.0	ug/L
Nickel	---	U	1.0	ug/L
Potassium	190		100	ug/L
Selenium	---	U	1.0	ug/L
Silver	---	U	1.0	ug/L
Sodium	84000		100	ug/L
Thallium	---	U	1.0	ug/L
Vanadium	---	U	1.0	ug/L
Zinc	98		2.0	ug/L



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Project: Matteo & Sons - 1811047  
Project Number: 1811047

Analyte	Result	Qualifier	Reporting Limit	Units	Date and Time of Analysis*
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Field ID: PW-901-EFF

Sample ID: 1811047-03

Mercury CVAA

Mercury	---	U	0.20	ug/L	
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Sanitary

Chromium, Hexavalent	---	U	10	ug/L	11/29/2018 9:14:00AM
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Cyanide, Total	---	U	10	ug/L	
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Field ID: TB-112818

Sample ID: 1811047-04

VOA-TRACE GCMS

Dichlorodifluoromethane	---	U L	0.50	ug/L	
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Chloromethane	---	U	1.0	ug/L	
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Vinyl Chloride	---	U J	0.50	ug/L	
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Bromomethane	---	U	1.0	ug/L	
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Chloroethane	---	U	1.0	ug/L	
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Trichlorofluoromethane	---	U	0.50	ug/L	
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1,1-Dichloroethene	---	U	0.50	ug/L	
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1,1,2-Trichloro-1,2,2-Trifluoroethane	---	U	0.50	ug/L	
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Carbon Disulfide	---	U	0.50	ug/L	
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Acetone	19		5.0	ug/L	
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Methyl Acetate	---	U	1.0	ug/L	
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Methylene Chloride	---	U	0.50	ug/L	
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trans-1,2-Dichloroethene	---	U	0.50	ug/L	
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Methyl tert-Butyl Ether	---	U	0.50	ug/L	
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1,1-Dichloroethane	---	U	0.50	ug/L	
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cis-1,2-Dichloroethene	---	U	0.50	ug/L	
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2-Butanone	---	U	5.0	ug/L	
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Bromochloromethane	---	U	0.50	ug/L	
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Chloroform	---	U	0.50	ug/L	
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1,1,1-Trichloroethane	---	U	0.50	ug/L	
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Cyclohexane	---	U	0.50	ug/L	
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Carbon Tetrachloride	---	U	0.50	ug/L	
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Project Number: 1811047

Analyte	Result	Qualifier	Reporting Limit	Units	Date and Time of Analysis*
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Field ID: TB-112818

Sample ID: 1811047-04

VOA-TRACE GCMS

Benzene	---	U	0.50	ug/L
1,2-Dichloroethane	---	U	0.50	ug/L
Trichloroethene	---	U	0.50	ug/L
1,2-Dichloropropane	---	U	0.50	ug/L
Bromodichloromethane	---	U	0.50	ug/L
cis-1,3-Dichloropropene	---	U	0.50	ug/L
4-Methyl-2-Pentanone	---	U L	5.0	ug/L
Toluene	---	U	0.50	ug/L
trans-1,3-Dichloropropene	---	U	0.50	ug/L
1,1,2-Trichloroethane	---	U	0.50	ug/L
Tetrachloroethene	---	U	0.50	ug/L
Methylcyclohexane	---	U	0.50	ug/L
Dibromochloromethane	---	U	0.50	ug/L
1,2-Dibromoethane	---	U	0.50	ug/L
2-Hexanone	---	U L	5.0	ug/L
Chlorobenzene	---	U	0.50	ug/L
Ethylbenzene	---	U	0.50	ug/L
m,p-Xylene	---	U	0.50	ug/L
o-Xylene	---	U	0.50	ug/L
Styrene	---	U	0.50	ug/L
Bromoform	---	U	0.50	ug/L
Isopropylbenzene	---	U	0.50	ug/L
1,1,2,2-Tetrachloroethane	---	U	0.50	ug/L
1,3-Dichlorobenzene	---	U	0.50	ug/L
1,4-Dichlorobenzene	---	U	0.50	ug/L
1,2-Dichlorobenzene	---	U	0.50	ug/L
1,2-Dibromo-3-Chloropropane	---	U	0.50	ug/L
1,2,4-Trichlorobenzene	---	U	0.50	ug/L



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Project Number: 1811047

Analyte	Result	Qualifier	Reporting Limit	Units	Date and Time of Analysis*
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Field ID: TB-112818

Sample ID: 1811047-04

VOA-TRACE GCMS

1,2,3-Trichlorobenzene	---	U	0.50	ug/L
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# Appendix F



## Appendix F

### Risk Assessment Calculations

**Appendix F Contents**  
**Matteo & Sons, Inc. Site**  
**Thorofare, NJ**

Tables

- F-1      Lead Concentrations in Surface Soil from the Mira Trucking Property
- F-2      Lead Concentrations in Surface Soil (0 -2 inches bgs) from the Residential Property P002
- F-3      Adult Lead Methodology (ALM) Calculation of Blood Lead Concentrations and Risk at Mira Trucking Property

IEUBK Input (Lead Model for Windows Version 1.1)

IEUBK Output (Probability Distribution Graph)

**Table F-1**  
**Lead Concentrations in Surface Soil from the Mira Trucking Property**  
**Matteo Sons, Inc. Site**  
**Thorofare, New Jersey**

Sample ID	Sample Location	Sample Event	Sample Date	Sample Depth	Result	Units
P001-SS044-0002-01	P001-SS044	Phase1	11/28/2017	0-2 inches	53700	mg/kg
P001-SS064-0002-01	P001-SS064	Phase2	12/17/2018	0-2 inches	451	mg/kg
P001-SS038-0002-01	P001-SS038	Phase1	11/27/2017	0-2 inches	43200	mg/kg
P001-SS052-0002-01	P001-SS052	Phase1	11/28/2017	0-2 inches	35700	mg/kg
P001-SS056-0002-01	P001-SS056	Phase1	11/28/2017	0-2 inches	33000	mg/kg
P001-TPF2-0006-01	P001-TPF2	Phase1	11/29/2017	0-6 inches	31100	mg/kg
P001-SS055-0002-01	P001-SS055	Phase1	11/28/2017	0-2 inches	20500	mg/kg
P001-SS048-0002-01	P001-SS048	Phase1	11/28/2017	0-2 inches	14200	mg/kg
P001-SS051-0002-01	P001-SS051	Phase1	11/28/2017	0-2 inches	10100	mg/kg
P001-TPC3-0006-01	P001-TPC3	Phase1	11/27/2017	0-6 inches	9280	mg/kg
P001-SS053-0002-01	P001-SS053	Phase1	11/28/2017	0-2 inches	8960	mg/kg
P001-SS028-0002-01	P001-SS028	Phase1	11/27/2017	0-2 inches	8440	mg/kg
P001-SS030-0002-01	P001-SS030	Phase1	11/27/2017	0-2 inches	6590	mg/kg
P001-TPG2-0006-01	P001-TPG2	Phase1	11/28/2017	0-6 inches	6130	mg/kg
P001-SS019-0002-01	P001-SS019	Phase1	11/28/2017	0-2 inches	5710	mg/kg
P001-TPC1-0006-01	P001-TPC1	Phase1	11/27/2017	0-6 inches	4770	mg/kg
P001-SS058-0002-01	P001-SS058	Phase1	11/28/2017	0-2 inches	4090	mg/kg
P001-TPH1-0006-01	P001-TPH1	Phase1	11/28/2017	0-6 inches	3120	mg/kg
P001-TPF5-0006-01	P001-TPF5	Phase1	11/29/2017	0-6 inches	2510	mg/kg
P001-SS041-0002-01	P001-SS041	Phase1	11/27/2017	0-2 inches	1960	mg/kg
P001-TP001-0006-01	P001-TP001	Phase1	11/29/2017	0-6 inches	1730	mg/kg
P001-TPC4-0006-01	P001-TPC4	Phase1	11/27/2017	0-6 inches	1310	mg/kg
P001-SS062-0002-01	P001-SS062	Phase1	11/28/2017	0-2 inches	1260	mg/kg
P001-SS018-0002-01	P001-SS018	Phase1	11/28/2017	0-2 inches	1210	mg/kg
P001-TPF3-0006-01	P001-TPF3	Phase1	11/29/2017	0-6 inches	1180	mg/kg
P001-SS006-0002-01	P001-SS006	Phase1	11/27/2017	0-2 inches	1160	mg/kg
P001-SS065-0002-01	P001-SS065	Phase2	12/17/2018	0-2 inches	720	mg/kg
P001-SS067-0002-01	P001-SS067	Phase2	12/17/2018	0-2 inches	892	mg/kg
P001-SS069-0002-01	P001-SS069	Phase2	12/17/2018	0-2 inches	341	mg/kg
P001-SS072-0002-01	P001-SS072	Phase2	12/17/2018	0-2 inches	183	mg/kg
P001-SS079-0002-01	P001-SS079	Phase2	12/17/2018	0-2 inches	446	mg/kg
P001-SS080-0002-01	P001-SS080	Phase2	12/17/2018	0-2 inches	4570	mg/kg
P001-SS081-0002-01	P001-SS081	Phase2	12/17/2018	0-2 inches	2320	mg/kg
P001-SS086-0002-01	P001-SS086	Phase2	12/20/2018	0-2 inches	419	mg/kg
P001-SS087-0002-01	P001-SS087	Phase2	12/20/2018	0-2 inches	778	mg/kg
P001-SS091-0002-01	P001-SS091	Phase2	12/17/2018	0-2 inches	9620	mg/kg
P001-SS092-0002-01	P001-SS092	Phase2	12/17/2018	0-2 inches	2520	mg/kg
P001-SS101-0002-01	P001-SS101	Phase2	12/17/2018	0-2 inches	432	mg/kg
P001-SS103-0002-01	P001-SS103	Phase2	12/17/2018	0-2 inches	2490	mg/kg
P001-SS104-0002-01	P001-SS104	Phase2	12/17/2018	0-2 inches	4370	mg/kg
P001-SS106-0002-01	P001-SS106	Phase2	12/20/2018	0-2 inches	1750	mg/kg

**Table F-1**  
**Lead Concentrations in Surface Soil from the Mira Trucking Property**  
**Matteo Sons, Inc. Site**  
**Thorofare, New Jersey**

Sample ID	Sample Location	Sample Event	Sample Date	Sample Depth	Result	Units
P001-SS107-0002-01	P001-SS107	Phase2	12/20/2018	0-2 inches	909	mg/kg
P001-SS110-0002-01	P001-SS110	Phase2	12/20/2018	0-2 inches	4780	mg/kg
P001-SS112-0002-01	P001-SS112	Phase2	12/17/2018	0-2 inches	2450	mg/kg
P001-SS113-0002-01	P001-SS113	Phase2	12/17/2018	0-2 inches	7140	mg/kg
P001-SS114-0002-01	P001-SS114	Phase2	12/20/2018	0-2 inches	1020	mg/kg
P001-SS122-0002-01	P001-SS122	Phase2	12/20/2018	0-2 inches	1710	mg/kg
P001-SS125-0002-01	P001-SS125	Phase2	12/18/2018	0-2 inches	330	mg/kg
P001-SS126-0002-01	P001-SS126	Phase2	12/17/2018	0-2 inches	3090	mg/kg
P001-SS127-0002-01	P001-SS127	Phase2	12/20/2018	0-2 inches	8920	mg/kg
P001-SS132-0002-01	P001-SS132	Phase2	12/20/2018	0-2 inches	878	mg/kg
P001-SS136-0002-01	P001-SS136	Phase2	12/20/2018	0-2 inches	597	mg/kg
P001-SS137-0002-01	P001-SS137	Phase2	12/19/2018	0-2 inches	591	mg/kg
P001-SS140-0002-01	P001-SS140	Phase2	12/19/2018	0-2 inches	6050	mg/kg
P001-SS141-0002-01	P001-SS141	Phase2	12/19/2018	0-2 inches	1480	mg/kg
P001-SS142-0002-01	P001-SS142	Phase2	12/18/2018	0-2 inches	4520	mg/kg
P001-SS144-0002-01	P001-SS144	Phase2	12/18/2018	0-2 inches	18700	mg/kg
P001-SS145-0002-01	P001-SS145	Phase2	12/19/2018	0-2 inches	3150	mg/kg
P001-SS148-0002-01	P001-SS148	Phase2	12/19/2018	0-2 inches	735	mg/kg
P001-SS149-0002-01	P001-SS149	Phase2	12/18/2018	0-2 inches	5330	mg/kg
P001-SS150-0002-01	P001-SS150	Phase2	12/18/2018	0-2 inches	1680	mg/kg
P001-SS151-0002-01	P001-SS151	Phase2	12/19/2018	0-2 inches	6870	mg/kg
P001-SS152-0002-01	P001-SS152	Phase2	12/19/2018	0-2 inches	6090	mg/kg
P001-SS154-0002-01	P001-SS154	Phase2	12/18/2018	0-2 inches	735	mg/kg
P001-SS155-0002-01	P001-SS155	Phase2	12/18/2018	0-2 inches	1340	mg/kg
P001-SS156-0002-01	P001-SS156	Phase2	12/18/2018	0-2 inches	2270	mg/kg
P001-SS157-0002-01	P001-SS157	Phase2	12/18/2018	0-2 inches	3410	mg/kg
P001-SS158-0002-01	P001-SS158	Phase2	12/18/2018	0-2 inches	272	mg/kg
P001-SS159-0002-01	P001-SS159	Phase2	12/19/2018	0-2 inches	1090	mg/kg
P001-SS162-0002-01	P001-SS162	Phase2	12/18/2018	0-2 inches	375	mg/kg
P001-SS163-0002-01	P001-SS163	Phase2	12/18/2018	0-2 inches	55.6	mg/kg
P001-SS164-0002-01	P001-SS164	Phase2	12/18/2018	0-2 inches	519	mg/kg
P001-SS165-0002-01	P001-SS165	Phase2	12/18/2018	0-2 inches	126	mg/kg
P001-SS166-0002-01	P001-SS166	Phase2	12/19/2018	0-2 inches	1960	mg/kg
P001-SS167-0002-01	P001-SS167	Phase2	12/19/2018	0-2 inches	690	mg/kg
P001-SS169-0002-01	P001-SS169	Phase2	12/18/2018	0-2 inches	726	mg/kg
P001-SS172-0002-01	P001-SS172	Phase2	12/19/2018	0-2 inches	1020	mg/kg
P001-SS173-0002-01	P001-SS173	Phase2	12/19/2018	0-2 inches	637	mg/kg
P001-SS176-0002-01	P001-SS176	Phase2	12/18/2018	0-2 inches	265	mg/kg
P001-SS178-0002-01	P001-SS178	Phase2	12/18/2018	0-2 inches	90.4	mg/kg
P001-SS179-0002-01	P001-SS179	Phase2	12/19/2018	0-2 inches	1780	mg/kg
P001-SS180-0002-01	P001-SS180	Phase2	12/19/2018	0-2 inches	287	mg/kg

**Table F-1**  
**Lead Concentrations in Surface Soil from the Mira Trucking Property**  
**Matteo Sons, Inc. Site**  
**Thorofare, New Jersey**

Sample ID	Sample Location	Sample Event	Sample Date	Sample Depth	Result	Units
P001-SS181-0002-01	P001-SS181	Phase2	12/19/2018	0-2 inches	342	mg/kg
P001-SS185-0002-01	P001-SS185	Phase2	12/19/2018	0-2 inches	233	mg/kg
P001-SS190-0002-01	P001-SS190	Phase2	12/19/2018	0-2 inches	1920	mg/kg
P001-SS191-0002-01	P001-SS191	Phase2	12/19/2018	0-2 inches	664	mg/kg
P001-SS202-0002-01	P001-SS202	Phase2	12/19/2018	0-2 inches	288	mg/kg
P001-SS203-0002-01	P001-SS203	Phase2	12/19/2018	0-2 inches	3000	mg/kg
P001-SS204-0002-01	P001-SS204	Phase2	12/19/2018	0-2 inches	11400	mg/kg
P001-SS205-0002-01	P001-SS205	Phase2	12/19/2018	0-2 inches	28.8	mg/kg
P001-SS208-0002-01	P001-SS208	Phase2	12/18/2018	0-2 inches	117	mg/kg
P001-SS209-0002-01	P001-SS209	Phase2	12/19/2018	0-2 inches	40.7	mg/kg
P001-SS210-0002-01	P001-SS210	Phase2	12/19/2018	0-2 inches	91.5	mg/kg
P001-SS211-0002-01	P001-SS211	Phase2	12/19/2018	0-2 inches	131	mg/kg
P001-SS213-0002-01	P001-SS213	Phase2	12/19/2018	0-2 inches	56.6	mg/kg
P001-SS215-0002-01	P001-SS215	Phase2	12/19/2018	0-2 inches	3.77	mg/kg
P001-SS218-0002-01	P001-SS218	Phase2	12/19/2018	0-2 inches	105	mg/kg
P001-SS219-0002-01	P001-SS219	Phase2	12/19/2018	0-2 inches	138	mg/kg
P001-SS220-0002-01	P001-SS220	Phase2	12/19/2018	0-2 inches	104	mg/kg
P001-SS222-0002-01	P001-SS222	Phase2	12/19/2018	0-2 inches	25.9	mg/kg
P001-SS223-0002-01	P001-SS223	Phase2	12/19/2018	0-2 inches	83.1	mg/kg
P001-SS226-0002-01	P001-SS226	Phase2	12/17/2018	0-2 inches	1210	mg/kg
P001-SS227-0002-01	P001-SS227	Phase2	12/17/2018	0-2 inches	1510	mg/kg
P001-SS046-0002-01	P001-SS046	Phase1	11/28/2017	0-2 inches	1120	mg/kg
P001-TPF6-0006-01	P001-TPF6	Phase1	11/29/2017	0-6 inches	1050	mg/kg
P001-TPI2-0006-01	P001-TPI2	Phase1	11/28/2017	0-6 inches	964	mg/kg
P001-TPH4-0006-01	P001-TPH4	Phase1	11/28/2017	0-6 inches	604	mg/kg
P001-TPF1-0006-01	P001-TPF1	Phase1	11/29/2017	0-6 inches	546	mg/kg
P001-SS008-0002-01	P001-SS008	Phase1	11/27/2017	0-2 inches	543	mg/kg
P001-SS008-0002-01	P001-SS008	Phase1	11/27/2017	0-2 inches	543	mg/kg
P001-TPB3-0006-01	P001-TPB3	Phase1	11/27/2017	0-6 inches	263	mg/kg
P001-SS016-0002-01	P001-SS016	Phase1	11/28/2017	0-2 inches	136	mg/kg
P001-SS002-0002-01	P001-SS002	Phase1	11/27/2017	0-2 inches	83	mg/kg
P001-SS014-0002-01	P001-SS014	Phase1	11/27/2017	0-2 inches	25.5	mg/kg
P001-TPH6-0006-01	P001-TPH6	Phase1	11/28/2017	0-6 inches	2.2	mg/kg
P002-SS010-0002-01	P002-SS010	Phase2	12/20/2018	0-2 inches	341	mg/kg

Arithmetic Mean: 4100 mg/kg  
Maximum: 53700 mg/kg  
Number of Samples: 116

**Table F-2**  
**Lead Concentrations in Surface Soil (0 -2 inches bgs) from the Residential Property P002**  
**Matteo Sons, Inc. Site**  
**Thorofare, New Jersey**

Sample ID	Sample Date	Result <sup>(1)</sup>	Units
P002-SS001-0002-01	Apr-18	420	mg/kg
P002-SS002-0002-01	Apr-18	280	mg/kg
P002-SS003-0002-01	Apr-18	190	mg/kg
P002-SS004-0002-01	Apr-18	210	mg/kg
P002-SS005-0002-01	Apr-18	200	mg/kg
P002-SS006-0002-01	Apr-18	170	mg/kg
P002-SS007-0002-01	Dec-18	170	mg/kg
P002-SS008-0002-01	Dec-18	NA <sup>(2)</sup>	mg/kg
P002-SS011-0002-01	Dec-18	397	mg/kg
P002-SS012-0002-01	Dec-18	354	mg/kg

Arithmetic Mean: 266

Maximum: 420

NA = Not available.

Notes:

<sup>(1)</sup> TAL confirmatory sample results are used in the lead evaluation.

<sup>(2)</sup> A confirmatory sample was not collected from the 0 - 2 inch interval at this location.

**Table F-3**  
**Adult Lead Methodology (ALM) Calculation of Blood Lead Concentrations and Risk at Mira Trucking Property(1)**  
**Matteo Sons, Inc. Site**  
**Thorofare, New Jersey**

**Calculations of Preliminary Remediation Goals (PRGs)**

Variable	Description of Variable	Units	GSDi and PbB <sub>0</sub> from Analysis of NHANES 2009-2014	Notes
PbS	Soil lead concentration	µg/g or ppm	4100	Average concentration in surface soil (0-2 inch interval) from Mira Trucking property
R <sub>fetal/maternal</sub>	Fetal/maternal PbB ratio	--	0.9	Default values from the EPA ALM model
BKSF	Biokinetic Slope Factor	µg/dL per µg/day	0.4	
GSD <sub>i</sub>	Geometric standard deviation PbB	--	1.8	
PbB <sub>0</sub>	Baseline PbB	µg/dL	0.6	
IR <sub>s</sub>	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050	
IR <sub>s+D</sub>	Total ingestion rate of outdoor soil and indoor dust	g/day	--	
W <sub>s</sub>	Weighting factor; fraction of IR <sub>s+D</sub> ingested as outdoor soil	--	--	
K <sub>SD</sub>	Mass fraction of soil in dust	--	--	
AF <sub>s, D</sub>	Absorption fraction (same for soil and dust)	--	0.12	
EF <sub>s, D</sub>	Exposure frequency (same for soil and dust)	days/yr	219	
AT <sub>s, D</sub>	Averaging time (same for soil and dust)	days/yr	365	
PbB <sub>adult</sub>	PbB of adult worker, geometric mean	µg/dL	6.5	Model result
PbB <sub>fetal, 0.95</sub>	95th percentile PbB among fetuses of adult workers	µg/dL	15.4	
PbB <sub>t</sub>	Target PbB level of concern (e.g., 2-8 ug/dL)	µg/dL	5.0	EPA Region 2
P(PbB <sub>fetal</sub> > PbB <sub>t</sub> )	Probability that fetal PbB exceeds target PbB, assuming lognormal distribution	%	60.6%	Model result

Notes:

(1) Based on the EPA Adult Lead Methodology (ALM) model spreadsheet developed by the EPA Technical Review Workgroup for Lead (version date 06/14/2017).

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil



# LEAD MODEL FOR WINDOWS Version 1.1

Model Version: 1.1 Build11

User Name:

Date:

Site Name:

Operable Unit:

Run Mode: Research

## \*\*\*\*\* Air \*\*\*\*\*

Indoor Air Pb Concentration: 30.000 percent of outdoor.

Other Air Parameters:

Age	Time Outdoors (hours)	Ventilation Rate (m <sup>3</sup> /day)	Lung Absorption (%)	Outdoor Air Pb Conc (µg Pb/m <sup>3</sup> )
.5-1	1.000	2.000	32.000	0.100
1-2	2.000	3.000	32.000	0.100
2-3	3.000	5.000	32.000	0.100
3-4	4.000	5.000	32.000	0.100
4-5	4.000	5.000	32.000	0.100
5-6	4.000	7.000	32.000	0.100
6-7	4.000	7.000	32.000	0.100

## \*\*\*\*\* Diet \*\*\*\*\*

Age Diet Intake(µg/day)

.5-1	2.260
1-2	1.960
2-3	2.130
3-4	2.040
4-5	1.950
5-6	2.050
6-7	2.220

## \*\*\*\*\* Drinking Water \*\*\*\*\*

Water Consumption:

Age Water (L/day)

.5-1	0.200
1-2	0.500
2-3	0.520
3-4	0.530
4-5	0.550
5-6	0.580
6-7	0.590

Drinking Water Concentration: 4.000 µg Pb/L

## \*\*\*\*\* Soil & Dust \*\*\*\*\*

Multiple Source Analysis Used

Average multiple source concentration: 196.200 µg/g

Mass fraction of outdoor soil to indoor dust conversion factor: 0.700

Outdoor airborne lead to indoor household dust lead concentration: 100.000

Use alternate indoor dust Pb sources? No

Age	Soil (µg Pb/g)	House Dust (µg Pb/g)
-----		
.5-1	266.000	196.200
1-2	266.000	196.200
2-3	266.000	196.200
3-4	266.000	196.200
4-5	266.000	196.200
5-6	266.000	196.200
6-7	266.000	196.200

\*\*\*\*\* Alternate Intake \*\*\*\*\*

Age	Alternate (µg Pb/day)
-----	
.5-1	0.000
1-2	0.000
2-3	0.000
3-4	0.000
4-5	0.000
5-6	0.000
6-7	0.000

\*\*\*\*\* Maternal Contribution: Infant Model \*\*\*\*\*

Maternal Blood Concentration: 1.000 µg Pb/dL

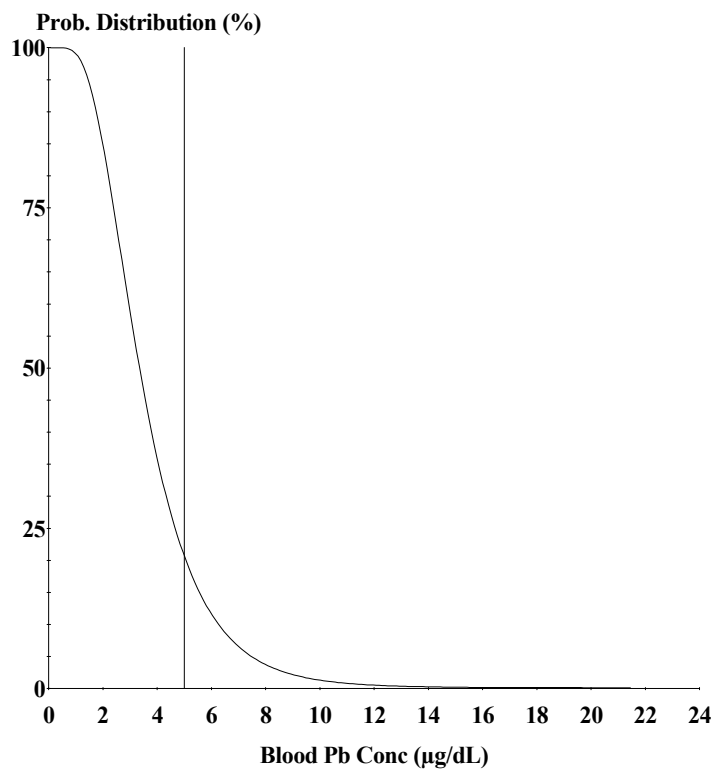
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# **CALCULATED BLOOD LEAD AND LEAD UPTAKES:**

\*\*\*\*\*

Year	Air (µg/day)	Diet (µg/day)	Alternate (µg/day)	Water (µg/day)
-----				
.5-1	0.021	1.046	0.000	0.370
1-2	0.034	0.895	0.000	0.914
2-3	0.062	0.985	0.000	0.962
3-4	0.067	0.954	0.000	0.991
4-5	0.067	0.931	0.000	1.050
5-6	0.093	0.986	0.000	1.116
6-7	0.093	1.072	0.000	1.140

Year	Soil+Dust (µg/day)	Total (µg/day)	Blood (µg/dL)
-----			
.5-1	5.371	6.808	3.7
1-2	8.423	10.267	4.2
2-3	8.524	10.533	3.9
3-4	8.618	10.629	3.7
4-5	6.518	8.565	3.1
5-6	5.911	8.106	2.6
6-7	5.606	7.911	2.3



**Cutoff = 5.000 µg/dl**  
**Geo Mean = 3.509**  
**GSD = 1.600**  
**% Above = 22.569**

**Age Range = User Designated: Ages 12 - 72 months**  
**Run Mode = Research**